BEFORE THE CORPORATION COMMISSION

OF THE STATE OF KANSAS

IN THE MATTER OF THE APPLICATION	]	
OF KANSAS GAS SERVICE, A DIVISION	]	KCC Docket No. 16-KGSG-491-RTS
OF ONE GAS, INC. FOR ADJUSTMENT	]	
OF ITS NATURAL GAS RATES IN THE	]	
STATE OF KANSAS	]	

DIRECT TESTIMONY OF

DR. J. RANDALL WOOLRIDGE

RE: COST OF CAPITAL

ON BEHALF OF

THE CITIZENS' UTILITY RATEPAYER BOARD

September 7, 2016

Kansas Gas Services Company
Docket No. 16-KGSG-491-RTS

Direct Testimony of
Dr. J. Randall Woolridge

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Q. PLEASE STATE YOUR FULL NAME, ADDRESS, AND OCCUPATION.

A. My name is J. Randall Woolridge, and my business address is 120 Haymaker Circle, State College, PA 16801. I am a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration at the University Park Campus of the Pennsylvania State University. I am also the Director of the Smeal College Trading Room and President of the Nittany Lion Fund, LLC. A summary of my educational background, research, and related business experience is provided in Appendix A.

I. SUBJECT OF TESTIMONY AND SUMMARY OF RECOMMENDATIONS

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. I have been asked by the Citizens Utility Ratepayer Board ("CURB") to provide an opinion as to the overall fair rate of return or cost of capital for the regulated gas distribution services of Kansas Gas Services ("KGS") and to evaluate KGS's rate of return testimony in this proceeding.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. First, I review my cost of equity recommendation for KGS, highlight several factors that have changed since the Company's last rate case, and discuss the primary areas of contention between KGS's rate of return position and my position. Second, I provide an assessment of capital costs in today's capital markets. Third, I discuss the selection of a proxy group of gas distribution companies for estimating the market cost of equity for KGS. Fourth, I present my recommendations for the Company's capital structure and

debt cost rate. Fifth, I provide an overview of the concept of the cost of equity capital, and then estimate the equity cost rate for KGS. Finally, I critique the Company's rate of return analysis and testimony.

A. Overview

Q. WHAT COMPRISES A UTILITY'S "RATE OF RETURN"?

A. A company's overall rate of return consists of three main categories: (1) capital structure (i.e., ratios of short-term debt, long-term debt, preferred stock and common equity); (2) cost rates for short-term debt, long-term debt, and preferred stock; and (3) common equity cost, otherwise known as return on equity ("ROE").

Q. WHAT IS A UTILITY'S ROE INTENDED TO REFLECT?

A. An ROE is most simply described as the allowed rate of profit for a regulated company. In a competitive market, a company's profit level is determined by a variety of factors, including the state of the economy, the degree of competition a company faces, the ease of entry into its markets, the existence of substitute or complementary products/services, the company's cost structure, the impact of technological changes, and the supply and demand for its services and/or products. For a regulated monopoly, the regulator determines the level of profit available to the utility. The United States Supreme Court established the guiding principles for establishing an appropriate level of profitability for regulated public utilities in two

cases: (1) *Bluefield* and (2) *Hope*.[1] In those cases, the Court recognized that the fair rate of return on equity should be: (1) comparable to returns investors expect to earn on investments with similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain the company's credit and to attract capital.

Thus, the appropriate ROE for a regulated utility requires determining the market-based cost of capital. The market-based cost of capital for a regulated firm represents the return investors could expect from other investments, while assuming no more and no less risk. The purpose of all of the economic models and formulas in cost of capital testimony (including those presented later in my testimony) is to estimate, using market data of similar-risk firms, the rate of return equity investors require for that risk-class of firms in order to set an appropriate ROE for a regulated firm.

Q. PLEASE REVIEW THE COMPANY'S PROPOSED RATE OF RETURN.

A. KGS witness Dr. Bruce H. Fairchild recommends a capital structure of 45.00% long-term debt and 55.0% common equity. He has proposed a long-term debt cost rate of 3.95% and a common equity cost rate of 10.0%. The Company's overall rate of return recommendation is 7.28%.

[1] *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591 (1944) ("*Hope*") and *Bluefield Water Works and Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 679 (1923) ("*Bluefield*").

Q. PLEASE REVIEW YOUR RECOMMENDATIONS REGARDING THE APPROPRIATE MARKET-BASED RATE OF RETURN FOR KGS.

A. My rate of return recommendation is provided in Exhibit JRW-1.

I show that the company's proposed capital structure includes a higher common equity ratio and lower financial risk than gas distribution companies. Therefore, I have used a capital structure consisting of 50% long-term debt and 50% common equity.

To determine an appropriate ROE for KGS, I have applied the Discounted Cash Flow ("DCF") model and the Capital Asset Pricing Model ("CAPM") to a proxy group of publicly-held gas distribution companies ("Gas Proxy Group"). This group is identical to Dr. Fairchild's group. My analysis indicates an equity cost rate of 8.50% is appropriate for KGS.

Using my capital structure and debt and equity cost rates, my overall rate of return recommendations for KGS is 6.23%.

B. KGS' Last Rate Case

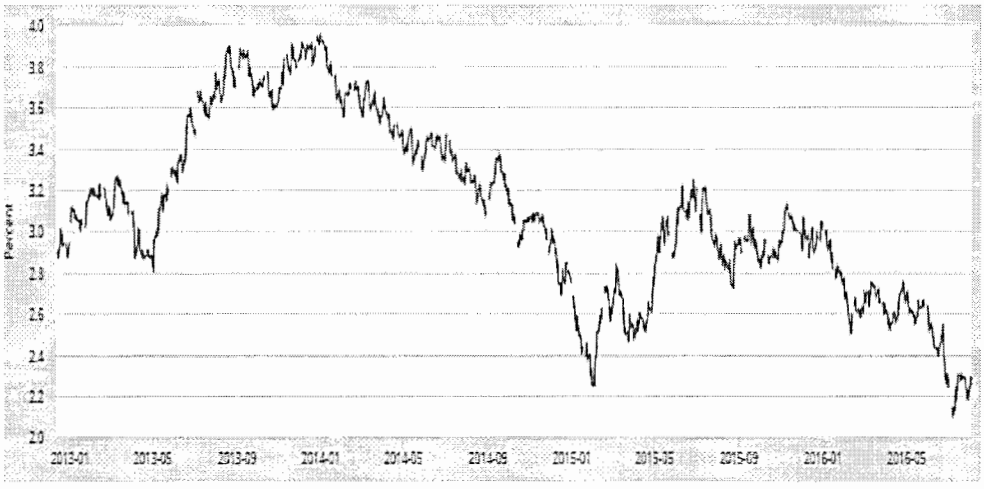
Q. PLEASE REVIEW THE OUTCOME OF THE COMPANY'S LAST RATE CASE.

A. On December 5, 2012, the Commission issued a final order approving a settlement between KGS, Commission staff, and CURB in Docket no. 12-KGSG-835-RTS. The Settlement provided for a rate increase of $28 million but did not specify a capital structure, ROE, or overall rate of return.

Q. WHAT HAS CHANGED IN CAPITAL MARKETS SINCE 2012?

A. Interest rates and capital costs have decreased in reaction to Federal Reserve monetary policy and changes in the economy. Figure 1 shows the 30-Year Treasury yield over the 2012-2016 time period. At the end of 2012, 30-Year Treasury Yield was in the 3.0% range. This yield increased to 4.0% in 2013 due to economic gains and in anticipation of the Federal Open Market Committee ("FOMC") unwinding it's Quantitative Easing III ("QEIII"). But, after QEIII was ended in January of 2014, the 30-Year Treasury yield declined to below 2.5% over the next year. Interest rates increased in 2015 to above 3.0% in anticipation of an increase in the federal funds rate. In December 2015, the Federal Reserve did increase its target rate for federal funds to 0.25 to 0.5 percent from 0.0 percent to 0.25 percent. Nonetheless, interest rates have since declined to below 2.5% in 2016. These yields have declined primarily to continued slow economic growth and low inflation.

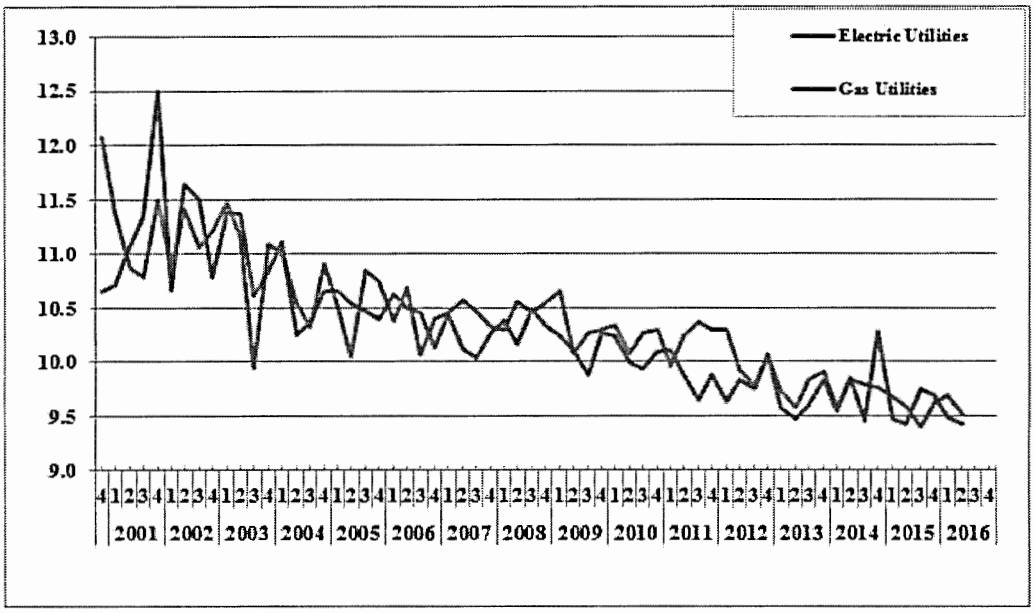
Figure 1
30-Year Treasury Yield
2013-2016
Source: https://research.stlouisfed.org/fred2/series/DGS30



Q. HAVE THE AUTHORIZED ROES FOR GAS DISTRIBUTION COMPANIES INCREASED OR DECREASED SINCE 2012?

A. Authorized ROEs for gas distribution companies have decreased since the Company's last rate case. As shown in Figure 2, the authorized ROEs for gas distribution companies have decreased in recent years. These authorized ROEs were 9.94% in 2012, 9.68% in 2013, 9.78% in 2014, 9.60% in 2015, and 9.45% in the first half of 2016, according to Regulatory Research Associates.[2]

Figure 2
Authorized ROEs for Electric Utility and Gas Distribution Companies
2000-2016



[2] *Regulatory Focus*, Regulatory Research Associates, various dates.

C. Summary of Rate of Return Issues

Q. PLEASE SUMMARIZE DR. FAIRCHILD'S RATE OF RETURN ON COMMON EQUITY RECOMMENDATION.

A. In arriving at a proposed common equity cost rate of 10.0%, Dr. Fairchild has employed the DCF and the CAPM approaches to group of gas distribution companies. He has also used Risk Premium ("RP") and Comparable Earnings ("CE") approaches to estimate an equity cost rate for KGS.

Q. PLEASE INITIALLY ADDRESS THE DIFFERENCES BETWEEN THE ALTERNATIVE ASSUMPTIONS REGARDING CAPITAL MARKET CONDITIONS BETWEEN YOUR EQUITY COST RATE ANALYSES AND DR. FAIRCHILD'S?

A. Dr. Fairchild and I have significantly different opinions regarding capital market conditions. Dr. Fairchild's analyses and ROE results and recommendations reflect the assumption of higher interest rates and capital costs. I review current market conditions and conclude that interest rates and capital costs are at historically low levels and are likely to remain low for some time. Moreover, I show that the interest rates forecasts used by Dr. Fairchild in his CAPM and RP models costs have been wrong for a decade.

Q. WHAT ARE THE DIFFERENCES BETWEEN YOUR DCF MODEL AND DR. FAIRCHILD'S DCF MODEL?

A. Dr. Fairchild has employed the traditional constant-growth DCF model. Dr. Fairchild reports a DCF equity cost rate range of 8.50% to 9.50%. There are two primary errors in Dr. Fairchild's DCF analyses. First, Dr. Fairchild's DCF growth rate range of 5.5% to 6.5% is overstated, in part because he has subjectively eliminated low-end DCF growth rates; Second, even with those eliminations and low growth rate range, he has given his DCF results very little weight in arriving at his 10.0% ROE recommendation.

I have also used a traditional constant-growth DCF model. In developing a growth rate for my DCF model, I have reviewed thirteen growth rate measures including historic and projected growth rate measures and have evaluated growth in dividends, book value, and earnings per share. I give primary weight to analysts' projected EPS growth rates.

Q. PLEASE DISCUSS THE DIFFERENCES BETWEEN YOUR APPLICATION OF THE CAPM AND THAT OF DR. FAIRCHILD.

A. The CAPM approach requires an estimate of the risk-free interest rate, beta, and the market or equity risk premium. The major area of disagreement involves the measurement and magnitude of the market or equity risk premium. Dr. Fairchild uses a historic risk premium of 7.00% and a projected market risk premium of 8.39%. Dr. Fairchild's market risk premium estimates are excessive and do not reflect current market fundamentals. As I discuss in my testimony, there are a number of empirical

issues with using historical stock and bond returns to estimate an expected market risk premium. Dr. Fairchild's projected equity risk premium uses analysts' EPS growth rate projections to compute an expected market return and market risk premium. These EPS growth rate projections and the resulting expected market returns and risk premiums include unrealistic assumptions regarding future economic and earnings growth and stock returns. Dr. Fairchild has also employed a size premium in his CAPM equity cost rate.

As I highlight in my testimony, there are three procedures for estimating a market or equity risk premium – historic returns, surveys, and expected return models. In my CAPM, I have used an equity risk premium of 5.5%, which: (1) factors in all three approaches to estimating an equity premium; and (2) employs the results of many studies of the equity risk premium. As I note, my market risk premium reflects the market risk premiums: (1) determined in recent academic studies by leading finance scholars; (2) employed by leading investment banks and management consulting firms; and (3) found in surveys of companies, financial forecasters, financial analysts, and corporate CFOs.

Q. WHAT ARE THE ERRORS WITH DR. FAIRCHILD'S RP MODEL?

A. Dr. Fairchild also uses a RP model to support his DCF and CAPM analyses. His risk premium is based on the historical relationship between the long-term utility yields and authorized ROEs for gas distribution companies. There are several problems with this approach. First and foremost, this approach is a gauge of commission behavior and not investor behavior. Capital costs are determined in the market place through

the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the risk and expected return of different investments. Regulatory commissions evaluate capital market data in setting authorized ROEs, but also take into account other utility- and rate case-specific information. As such, Dr. Fairchild's RP approach and results reflect other factors used by utility commissions in authorizing ROEs in addition to capital costs. This may especially be true when the authorized ROE data includes the results of rate cases that are settled and not fully litigated. Second, the methodology produces an inflated measure of the risk premium because the approach uses historic authorized ROEs and utility yields, and the resulting risk premium is applied to projected bond yields. Finally, the risk premium is inflated as a measure of an investor's required risk premium since gas distribution companies have been selling at market-to-book ratios in excess of 1.0. This indicates that the authorized rates of return have been greater than the return that investors require. In other words, customers have been paying too much for too long.

Q. HOW DO DR. FAIRCHILD'S RP ESTIMATES COMPARE TO THE ACTUAL STATE-LEVEL AUTHORIZED ROES FOR GAS DISTRIBUTION COMPANIES NATIONWIDE?

A. Dr. Fairchild's RP equity cost rate estimates for gas distribution companies range from 9.49% to 9.69%. These figures overstate actual state-level authorized ROEs. As noted above. The average authorized ROE for gas distribution companies for the

first six months of 2016 is 9.45%.[3]

Q. PLEASE ADDRESS DR. FAIRCHILD'S CE APPROACH?

A. Dr. Fairchild has also used a CE approach in which he averages *Value Line*'s projected ROE for his proxy gas companies. I show that this approach, which is not market-based, does not provide a reliable estimate of KGS' cost of equity capital.

Q. PLEASE SUMMARIZE THE PRIMARY DIFFERENCES IN POSITIONS REGARDING THE COMPANY'S COST OF CAPITAL.

A. The most significant areas of disagreement in measuring KGS's cost of capital are:

1. The Company's proposed capital structure has more equity and less financial risk than other gas companies. As a result, I have used a capital structure consisting of 50% long-term debt and 50% common equity;

2. Dr. Fairchild assessment of capital market conditions is flawed. In providing guidance on capital costs and in estimating KGS's ROE, he has relied upon economists' interest rate forecasts. Despite dire and unfounded predictions of rising interest rates over the past decade, long-term interest rates and capital costs are still at historically low levels. As I discuss below, there are strong indicators from my assessment study of global capital markets that long-term capital costs will remain low;

3. Dr. Fairchild's DCF equity cost rate estimates are biased and are not reflected in his 10% ROE recommendation. In particular, (1) his DCF growth rate range of 5.5%

[3] *Regulatory Focus*, Regulatory Research Associates, July, 2016. The electric utility authorized ROEs exclude the authorized ROEs in Virginia which include generation adders.

to 6.5% is overstated, in part because he has subjectively eliminated low-end DCF growth rates. This leads to an inflated DCF equity cost rate; and (2) even despite these eliminations and his overstated growth rate range, he has given his DCF results very little weight in arriving at his 10.0% ROE recommendation;

4. The historic and projected market or equity risk premiums in Dr. Fairchild's CAPM approach are not empirically sound and are not reflective of current market conditions and prospective earnings and economic growth; and

5. Dr. Fairchild's CE approach does not provide market-based estimate of KGS' cost on common equity capital.

II. CAPITAL COSTS IN TODAY'S MARKETS

A. Historical Interest Rates and Capital Costs

Q. PLEASE DISCUSS LONG-TERM INTEREST RATES AND CAPITAL COSTS IN U.S. MARKETS.

A. Long-term capital cost rates for U.S. corporations are a function of the required returns on risk-free securities plus a risk premium. The risk-free rate of interest is the yield on long-term U.S. Treasury bonds. The yields on 10-year U.S. Treasury bonds from 1953 to the present are provided on Panel A of Exhibit JRW-2.[4] These yields

[4] In my discussion of historic interest rates, I use the yields on 10-year Treasury bonds because the 30-year Treasury bond did not trade for a number of years in the 2000s. I do use the 30-year Treasury yield for my CAPM analysis.

peaked in the early 1980s and have generally declined since that time. These yields fell to below 3.0% in 2008 as a result of the financial crisis. From 2008 until 2011, these rates fluctuated between 2.5% and 3.5%. In 2012, the yields on 10-year Treasuries declined from 2.5% to 1.5% as the Federal Reserve initiated its Quantitative Easing III ("QEIII") program to support a low interest rate environment. These yields increased from mid-2012 to about 3.0% as of December of 2013 on speculation of a tapering of the Federal Reserve's QEIII policy. Since that time, the Federal Reserve has ended the QEIII program and has increased the federal funds rate. Nonetheless, due to slow economic growth and low inflation, the ten-year Treasury yield has declined and is now about 1.6%.

Panel B on Exhibit JRW-2 shows the differences in yields between ten-year Treasuries and Moody's Baa-rated bonds since the year 2000. This differential primarily reflects the additional risk premium required by bond investors for the risk associated with investing in corporate bonds as opposed to obligations of the U.S. Treasury. The difference also reflects, to some degree, yield curve changes over time. The Baa rating is the lowest of the investment grade bond ratings for corporate bonds. The yield differential hovered in the 2.0% to 3.5% range until 2005, declined to 1.5% until late 2007, and then increased significantly in response to the financial crisis. This differential peaked at 6.0% at the height of the financial crisis in early 2009 due to tightening in credit markets, which increased corporate bond yields, and the "flight to quality," which decreased Treasury yields. The differential subsequently declined and bottomed out at 2.4%. The differential has since increased to the 3.25% range.

Q. YOU MENTIONED RISK PREMIUM BEING REFLECTED AS THE DIFFERENTIAL BETWEEN THE TEN-YEAR TREASURIES AND MOODY'S BAA-RATED BONDS. PLEASE EXPLAIN WHAT THE RISK PREMIUM IS AND HOW IT AFFECTS YOUR ANALYSIS?

A. The risk premium is the return premium required by investors to purchase riskier securities. The risk premium required by investors to buy corporate bonds is observable based on yield differentials in the markets. The market risk premium is the return premium required to purchase stocks as opposed to bonds. The market or equity risk premium is not readily observable in the markets (like bond risk premiums) since expected stock market returns are not readily observable. As a result, equity risk premiums must be estimated using market data. There are alternative methodologies to estimate the equity risk premium, and these alternative approaches and equity risk premium results are subject to much debate. One way to estimate the equity risk premium is to compare the mean returns on bonds and stocks over long historical periods. Measured in this manner, the equity risk premium has been in the 5% to 7% range.[5] Studies by leading academics indicate, however, that the forward-looking equity risk premium is actually in the 4% to 6% range. These lower equity risk premium results are in line with the findings of equity risk premium surveys of CFOs, academics, analysts, companies, and financial forecasters.

Q. WHAT ABOUT INTEREST RATES ON LONG-TERM UTILITY BONDS?

A. Panel A of Exhibit JRW-3 provides the yields on A-rated public utility bonds. These

[5] See Exhibit JRW-11, p. 5-6.

yields peaked in November 2008 at 7.75% and henceforth declined significantly. These yields declined to below 4.0% in mid-2013, and then increased with interest rates in general to the 4.85% range as of late 2013. These rates dropped significantly during 2014 due to economic growth concerns and were bottomed out below 4.0% in the first quarter of 2015. They increased with interest rates in general to 4.4% in the summer of 2015, and have since declined to below 4.0% due to continued low economic growth and inflation.

Panel B of Exhibit JRW-3 provides the yield spreads between long-term A-rated public utility bonds relative to the yields on 20-year U.S. Treasury bonds. These yield spreads increased dramatically in the third quarter of 2008 during the peak of the financial crisis and have decreased significantly since that time. The yield spreads between 20-year U.S. Treasury bonds and A-rated utility bonds peaked at 3.4% in November 2008, declined to about 1.5% in the summer of 2012 as investor return requirements declined. The differential has gradually increased in recent years, and is now about 1.75%.

B. The Outlook for Interest Rates and Capital Costs

Q. WHY ARE CAPITAL MARKET CONDITIONS AND THE OUTLOOK FOR INTEREST RATES AND CAPITAL COSTS IMPORTANT IN THIS CASE?

A. As discussed above, a company's rate of return is its overall cost of capital. Capital costs, including the cost of debt and equity financing, are established in capital markets and reflect investors' return requirements on alternative investments based on

risk and capital market conditions. These capital market conditions are a function of investors' expectations concerning many factors, including economic growth, inflation, government monetary and fiscal policies, and international developments, among others. In the wake of the financial crisis, much of the focus in the capital markets has been on the interaction of economic growth, interest rates, and the actions of the Federal Reserve. In addition, as illustrated in the United Kingdom's June 24th vote to leave the European Union ("BREXIT"), capital markets are global and capital costs are impacted by global events.

Q. WHAT IS DR. FAIRCHILD'S ASSESSMENT OF THE CAPITAL MARKETS ENVIRONMENT?

A. Between pages 8-11 of his testimony, Dr. Fairchild discusses the capital markets environment. Dr. Fairchild argues that market data and economists' projections indicate that long-term interest rates are going to increase and uses these projections in his CAPM and RP equity cost rate analyses.

Q. PLEASE EXPLAIN YOUR CONCERNS REGARDING DR. FAIRCHILD'S CONCLUSION OF HIGHER LONG-TERM INTEREST RATES?

A. In the last couple years, with the end of the Federal Reserve's QEIII program as well as the Federal Reserve's December 16, 2015 decision to raise the federal funds rate, there have been forecasts of higher long-term interest rates. However, these forecasts have proven to be wrong. For example, after the announcement of the end of QEIII program, all the economists in Bloomberg's interest rate survey forecasted interest

rates would increase in 2014, and 100% of the economists were wrong. According to the *Market Watch* article:[6]

> The survey of economists' yield projections is generally skewed toward rising rates — only a few times since early 2009 have a majority of respondents to the Bloomberg survey thought rates would fall. But the unanimity of the rising rate forecasts in the spring was a stark reminder of how one-sided market views can become. It also teaches us that economists can be universally wrong.

Two other financial publications have produced studies on how economists consistently predict higher interest rates, yet the economists have been wrong. The first publication, entitled "How Interest Rates Keep Making People on Wall Street Look Like Fools," evaluated economists' forecasts for the yield on ten-year Treasury bonds at the beginning of the year for the last ten years.[7] The results demonstrated that economists consistently predict that interest rates will go higher, and interest rates have not fulfilled those predictions.

The second study tracked economists' forecasts for the yield on 10-Year Treasury bonds on an ongoing basis from 2010 until 2015.[8] The results of this study, which was entitled "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," are shown in Figure 3 and demonstrate how economists continually forecast that interest rates are going up; however, they do not. Indeed, as Bloomberg has reported, economists' continued failure in forecasting increasing interest rates has caused the Federal Reserve Bank of New York to stop using the interest rate

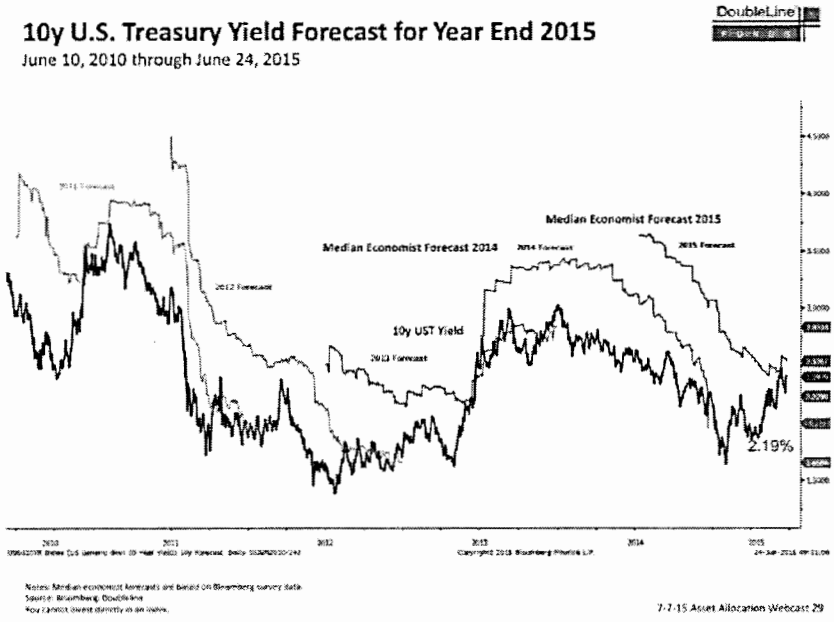
[6] Ben Eisen, "Yes, 100% of economists were dead wrong about yields, *Market Watch*," October 22, 2014 http://www.marketwatch.com/story/yes-100-of-economists-were-dead-wrong-about-yields-2014-10-21.

[7] Joe Weisenthal, "How Interest Rates Keep Making People on Wall Street Look Like Fools," Bloomberg.com, March 16, 2015. http://www.bloomberg.com/news/articles/2015-03-16/how-interest-rates-keep-making-people-on-wall-street-look-like-fools.

[8] Akin Oyedele, "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," *Business Insider*, July 8, 2015. http://www.businessinsider.com/interest-rate-forecasts-are-wrong-most-of-the-time-2015-7.

estimates of professional forecasters in the Bank's interest rate model due to the unreliability of those forecasters' interest rate forecasts.[9]

Figure 3
Economists' Forecasts of the 10-Year Treasury Yield
2010-2015



Source: Akin Oyedele, "Interest Rate Forecasters are Shockingly Wrong Almost All of the Time," *Business Insider*, July 8, 2015. http://www.businessinsider.com/interest-rate-forecasts-are-wrong-most-of-the-time-2015-7.

Q. PLEASE REVIEW THE FEDERAL RESERVE'S DECISION TO RAISE THE FEDERAL FUNDS RATE IN DECEMBER 2015.

A. On December 16, 2015, the Federal Reserve decided to increase the target rate for federal funds to 0.25 to 0.50 percent. The federal funds rate is set by the Federal Reserve and is the borrowing rate applicable to the most creditworthy financial

[9] Susanne Walker and Liz Capo McCormick, "Unstoppable $100 Trillion Bond Market Renders Models Useless," Bloomberg.com (June 2, 2014). http://www.bloomberg.com/news/2014-06-01/the-unstoppable-100-trillion-bond-market-renders-models-useless.html.

institutions when they borrow and lend funds overnight to each other.[10] In the release, the FOMC included the following observations:[11]

> The Committee currently expects that, with gradual adjustments in the stance monetary policy, economic activity will continue to expand at a moderate pace and labor market indicators will continue to strengthen. Overall, taking into account domestic and international developments, the Committee sees the risks to the outlook for both economic activity and the labor market as balanced. Inflation is expected to rise to 2 percent over the medium term as the transitory effects of declines in energy and import prices dissipate and the labor market strengthens further. The Committee continues to monitor inflation developments closely.

This increase comes after the range was kept in the 0.0 to 0.25 percent range for over five years in order to spur economic growth in the wake of the financial crisis. The move occurred almost two years after the end of QEIII program, the Federal's Reserve's bond buying program. The Federal Reserve has been cautious in its approach to scaling its monetary intervention, and has paid close attention to a number of economic variables, including GDP growth, retail sales, consumer confidence, unemployment, the housing market, and inflation. While the Federal Reserve has cited improvements in many areas of the economy, it has expressed concern with the low inflation rate – below the Federal Reserve's target of 2.0%.

Q. HOW DID LONG-TERM INTEREST RATES REACT TO THE FEDERAL RESERVE'S DECISION TO INCREASE THE FEDERAL FUND RATE?

A. The yields on long-term Treasury bonds decreased. The FOMC's decision to increase the federal fund rate range was highly anticipated in the markets. Nonetheless, as shown in the Figure 4, at the 2:00 PM announcement of the increase

[10] http://www.investopedia.com/terms/f/federalfundsrate.asp.
[11] Board of Governors of the Federal Reserve System, *FOMC Statement* (Dec. 16, 2015).

in the Federal Funds rate, the yield on 30-Year U.S. Treasury bonds actually decreased!

Figure 4

Intra-Day 30-Year Treasury Yields
December 16, 2015
Source: www.Yahoo.com

Q. WHAT HAS HAPPENED TO THE YIELD ON 30-YEAR U.S. TREASURY BOND SINCE THAT DECEMBER 16 DECISION?

A. The yield on 30-Year Treasury bonds continued to decline in 2016 and are below 2.50%. They declined further on June 24th with the United Kingdom's BREXIT referendum outcome. Such events illustrate that interest rates and capital costs are a function of global market developments and events. And while U.S. interest rates and capital cost are still at historically low levels, the fact that global investors bought U.S. Treasuries due to BREXIT indicates U.S. Treasuries have favorable expected returns relative to the government securities of other major countries, such as Britain, Germany, and Japan.

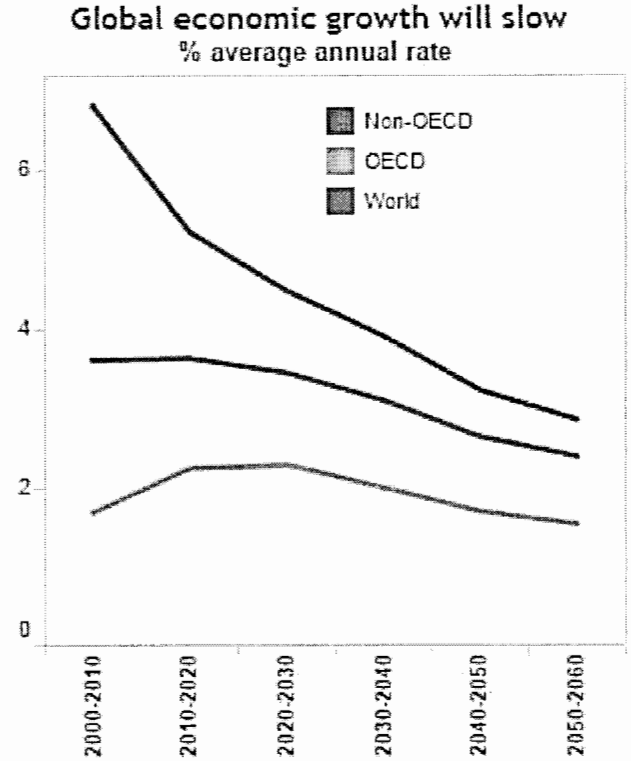
Q. HOW WILL INTEREST RATES AND COST OF CAPITAL BE AFFECTED BY ECONOMIC FACTORS IN THE LONG TERM?

A. In the long run, the key drivers of economic growth measured in nominal dollars are population growth, the advancement and diffusion of science and technology, and currency inflation. Although we experienced rapid economic growth during the "post-war" period (the 63 years that separated the end of World War II and the 2008 financial crisis), the post-war period is not necessarily reflective of expected future growth. It was marked by a near-trebling of global population, from under 2.5 billion to approximately 6.7 billion. Over the succeeding 63 years, according to U.N. projections, the global population will grow considerably more slowly, reaching approximately 10.3 billion in 2070. With population growth slowing, life expectancies lengthening, and post-war "baby boomers" reaching retirement age, median ages in developed-economy nations have risen and continue to rise. The postwar period was also marked by rapid catch-up growth as Europe, Japan, and China recovered from successive devastations and, regions such as India and China have leapfrogged technologies that had been developed over a much longer period in earlier-industrialized nations. That period of rapid catch-up growth is coming to an end. For example, although China remains one of the world's fastest-growing regions, its growth is now widely expected to slow substantially. This convergence of projected growth in the former "second world" and "third world" towards the slower growth of the nations that have long been considered "first world" is illustrated in this

"key findings" chart published by the Organization for Economic Co-operation and Development:[12]

Figure 5
Projected Global Growth

Global growth will slow from 3.6% in 2010-2020 to 2.4% in 2050-2060 and will be increasingly driven by innovation and investment in skills.



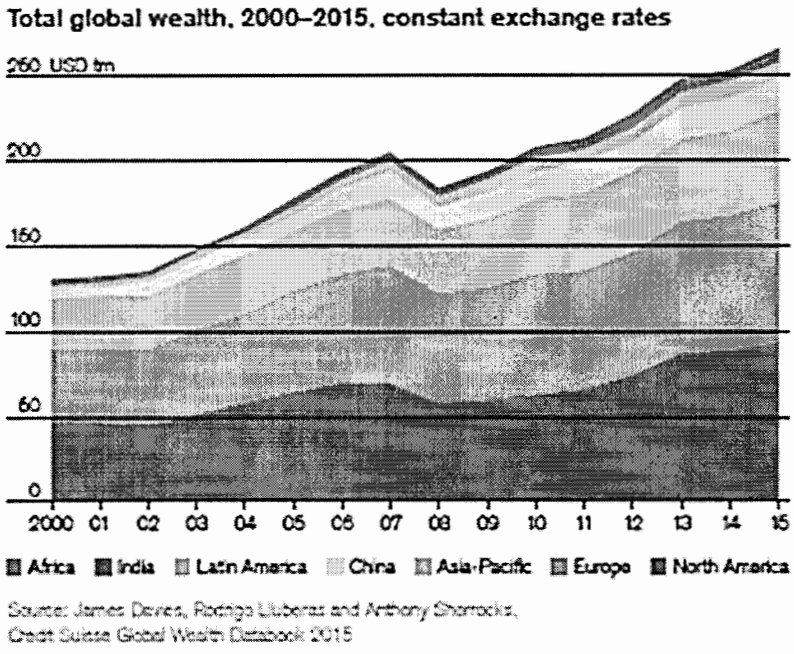
As to dollar inflation, it has declined to far below the level it reached in the 1970s. The Federal Reserve targets a 2% inflation rate, but its policies have been unable to achieve even that level of inflation. Indeed, inflation has been below the Federal Reserve's target rate for over four years due to a number of factors, including slow global economic growth, slack in the economy, and declining energy and commodity prices. The slow pace of inflation is also reflected in the decline in

[12] See http://www.oecd.org/eco/outlook/lookingto2060.htm.

forecasts of future inflation. The Energy Information Administration's ("EIA's) annual Energy Outlook includes in its nominal GDP growth projection a long-term inflation component, which the EIA projects at only 1.8% per year for its forecast period through 2040.[13]

All of this translates into slowed growth in annual economic production and income, even when measured in nominal rather than real dollars. Meanwhile, the stored wealth that is available to fund investments has continued to rise. According to the most recent release of the Credit Suisse global wealth report, global wealth has more than doubled since the turn of this century, notwithstanding the temporary setback following the 2008 financial crisis:

Figure 6
Global Wealth – 2000-2015



[13] See EIA Annual Energy Outlook 2015, Table 20 (available at http://www.eia.gov/forecasts/aeo/tables_ref.cfm).

These long-term trends mean that overall, and relative to what had been the post-war norm, the world now has more wealth chasing fewer opportunities for investment rewards. Ben Bernanke, the former Chairman of the Federal Reserve, called this phenomenon a "global savings glut."[14] Like any other liquid market, capital markets are subject to the law of supply and demand. With a large supply of capital available for investment and relatively scarce demand for investment capital, it should be no surprise to see the cost of investment capital decline and, therefore, interest rates remaining low.

Q. ON THE ISSUE ON THE FEDERAL RESERVE AND LONG-TERM INTEREST RATES, PLEASE HIGHLIGHT FORMER FEDERAL RESERVE CHAIRMAN BEN BERNANKE'S RECENT TAKE ON THE LOW INTEREST RATES IN THE U.S.

A. Mr. Bernanke addressed the issue of the continuing low interest rates in his weekly Brookings Blog. Mr. Bernanke indicated that the focus should be on real and not nominal interest rates and noted that, in the long term, these rates are not determined by the Federal Reserve:[15]

> If you asked the person in the street, "Why are interest rates so low?," he or she would likely answer that the Fed is keeping them low. That's true only in a very narrow sense. The Fed does, of course, set the benchmark nominal short-term interest rate. The Fed's policies are also the primary determinant of inflation and inflation expectations over the longer term, and inflation trends affect interest rates, as the figure above shows. But what matters

[14] Ben S. Bernanke, *The Global Saving Glut and the U.S. Current Account Deficit* (Mar. 10, 2005), available at http://www.federalreserve.gov/boarddocs/speeches/2005/200503102/.

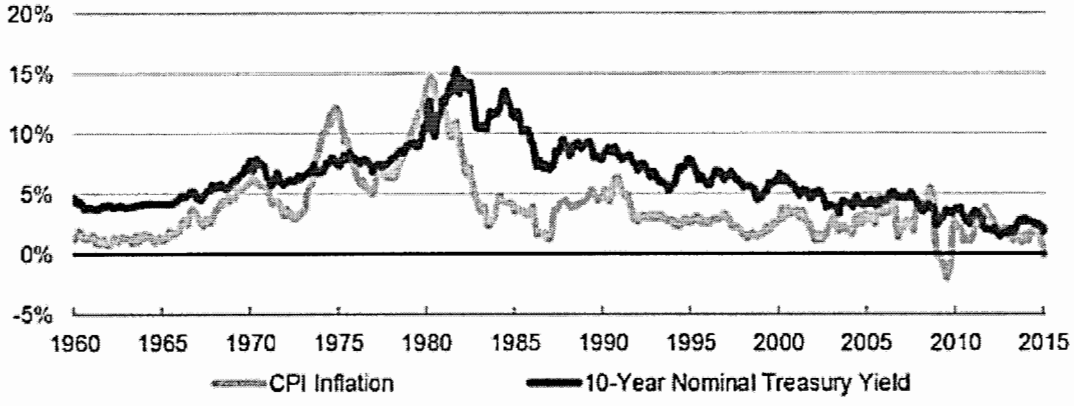
[15] Ben S. Bernanke, "Why are Interest Rates So Low," Weekly Blog, Brookings, March 30, 2015. www.brookings.edu/blogs/ben-bernanke/posts/2015/03/30-why-interest-rates-so-low.

> most for the economy is the real, or inflation-adjusted, interest rate (the market, or nominal, interest rate minus the inflation rate). The real interest rate is most relevant for capital investment decisions, for example. The Fed's ability to affect real rates of return, especially longer-term real rates, is transitory and limited. Except in the short run, real interest rates are determined by a wide range of economic factors, including prospects for economic growth—not by the Fed.

Mr. Bernanke also addressed the issue about whether low-interest rates are a short-term aberration or a long-term trend:[16]

> Low interest rates are not a short-term aberration, but part of a long-term trend. As the figure below shows, ten-year government bond yields in the United States were relatively low in the 1960s, rose to a peak above 15 percent in 1981, and have been declining ever since. That pattern is partly explained by the rise and fall of inflation, also shown in the figure. All else equal, investors demand higher yields when inflation is high to compensate them for the declining purchasing power of the dollars with which they expect to be repaid. But yields on inflation-protected bonds are also very low today; the real or inflation-adjusted return on lending to the U.S. government for five years is currently about minus 0.1 percent.

Figure 7
Interest Rates and Inflation
1960-Present



Source: Federal Reserve Board, BLS.

BROOKINGS

[16] Ben S. Bernanke, "Why are Interest Rates So Low," Weekly Blog, Brookings, March 30, 2015. http://www.brookings.edu/blogs/ben-bernanke/posts/2015/03/30-why-interest-rates-so-low.

Q. CAN YOU PLEASE PROVIDE THE COMMISSION WITH YOUR OPINION REGARDING THE FUTURE OUTLOOK FOR INTEREST RATES AND CAPITAL COSTS?

A. I believe that U.S. Treasuries offer an attractive yield, relative to those of other major governments around the world, which will attract capital to the U.S. and keep U.S. interest rates down. There are several factors driving this conclusion.

First, the economy has been growing for over five years, and, as noted above, the Federal Reserve sees continuing strength in the economy. The labor market has improved, with the July, 2016 U.S. unemployment now down to 4.9%.[17]

Second, interest rates remain at historically low levels and are likely to remain low. There are two factors driving the continued lower interest rates: (1) inflationary expectations in the U.S. remain low and remain below the FOMC's target of 2.0%; and (2) global economic growth – including Europe where growth is stagnant and China where growth is slowing significantly. As a result, while the yields on long-term U.S. Treasury bonds are low by historical standards, these yields are well above the government bond yields in Germany, Japan, and the United Kingdom. Thus, U.S. Treasuries offer an attractive yield relative to those of other major governments around the world, thereby attracting capital to the U.S. and keeping U.S. interest rates down.

[17] Bureau of Labor Statistics, available at http://www.bls.gov/news.release/laus.nr0.htm.

Q. WHAT DO YOU RECOMMEND THE COMMISSION DO REGARDING THE FORECASTS OF HIGHER INTEREST RATES AND CAPITAL COSTS?

A. I suggest that the Commission set an equity cost rate based on current market cost rate indicators and not speculate on the future direction of interest rates. As the above studies indicate, economists are always predicting that interest rates are going up, and yet they are almost always wrong. Obviously, investors are well aware of the consistently wrong forecasts of higher interest rates, and therefore place little weight on such forecasts. Investors would not be buying long-term Treasury bonds or utility stocks at their current yields if they expected interest rates to suddenly increase, thereby producing higher yields and negative returns. For example, consider a utility that pays a dividend of $2.00 with a stock price of $50.00. The current dividend yield is 4.0%. If, as Dr. Fairchild suggests, interest rates and required utility yields increase, the price of the utility stock would decline. In the example above, if higher return requirements led the dividend yield to increase from 4.0% to 5.0% in the next year, the stock price would have to decline to $40, which would be a -20% return on the stock. Obviously, investors would not buy the utility stock with an expected return of -20% due to higher dividend yield requirements.

In sum, it is practically impossible to accurately forecast rates and prices of investments that are determined in the financial markets, such as interest rates, and prices for stocks and commodities. For interest rates, I have never seen a study that suggests one forecasting service is consistently better than others or that interest rate forecasts are consistently better than just assuming the current interest rate will be the rate in the future. As discussed above, investors would not be buying long-term

Treasury bonds or utility stocks at their current yields if they expected interest rates to suddenly increase, thereby producing higher yields and negative returns.

III. PROXY GROUP SELECTION

Q. PLEASE DESCRIBE YOUR APPROACH TO DEVELOPING A FAIR RATE OF RETURN RECOMMENDATION FOR KGS.

A. To develop a fair rate of return recommendation for KGS, I have evaluated the return requirements of investors on the common stock of a proxy group of publicly-held gas distribution companies.

Q. PLEASE DESCRIBE YOUR PROXY GROUP OF GAS DISTRIBUTION COMPANIES.

A. My Gas Proxy Group consists of eight natural gas distribution companies. These companies include: Atmos Energy, Chesapeake Utilities, New Jersey Resources, Northwest Natural Gas Company, South Jersey Industries, Southwest Gas, Spire', Inc., and WGL Holdings.

Summary financial statistics for the proxy group are listed in Exhibit JRW-4.[18] The median operating revenues and net plant among members of the Gas Proxy Group are $1,835.7 and $2,715.8, respectively. The group's median receives 63% of revenues from regulated gas operations, has an A- average issuer credit rating from

[18] In my testimony, I present financial results using both mean and medians as measures of central tendency. However, due to outliers among means, I have used the median as a measure of central tendency.

Standard & Poor's and an A3 long-term rating from Moody's, a current common equity ratio of 52.6%, and an earned return on common equity of 10.1%.

IV. CAPITAL STRUCTURE RATIOS AND DEBT COST RATES

Q. WHAT IS KGS' PROPOSED CAPITAL STRUCTURE AND SENIOR CAPITAL COST RATES FOR RATEMAKING PURPOSES?

A. Dr. Fairchild has proposed a capital structure that includes 45.00% long-term debt and 55.00% common equity and a long-term debt cost rate of 3.95%. To support his 45%/55% capital structure, Dr. Fairchild cites: (1) One Gas' 40%/60% debt to equity capital structure; and (2) the 40%/60% debt to equity capital structure that other divisions of One Gas have agreed to in settlements in OK and TX.

Q. WHAT ARE THE AVERAGE CAPITALIZATION RATIOS OF THE GAS PROXY GROUP?

A. Panel B of page 1 of Exhibit JRW-4 shows that the average of the quarterly capitalization ratios for the Gas Proxy Group. The individual company data is provided on page 2 of Exhibit JRW-5. The average capitalization ratios are 11.24% short-term debt, 38.67% long-term debt, 0.13% preferred stock, and 48.79% common equity.

It should be noted that these capitalization ratios include total debt which consists of both short-term and long-term debt. The Company has not included any short-term debt in its proposed capitalization. But, as this study suggests, gas distribution

companies do use short-term debt on a regular basis. Hence, in assessing financial risk and an appropriate common equity ratio, short-term debt must be included because, just like long-term debt, short-term has a higher claim on the assets and earnings of the company and requires timely payment of interest and repayment of principal.

Q. WHAT CAPITALIZATION RATIOS ARE YOU RECOMMENDING FOR KGS?

A. Based on my study of the capitalization ratios off the Gas Proxy Group, I am using a capitalization of 50% long-term debt and 50% common equity. This is summarized in Panel C of page 1 of Exhibit JRW-5.

Q. WHAT SENIOR DEBT CAPITAL COST RATE ARE YOU USING

A. I will use the Company's proposed long-term debt cost rate of 3.95%.

V. THE COST OF COMMON EQUITY CAPITAL

A. Overview

Q. WHY MUST AN OVERALL COST OF CAPITAL OR FAIR RATE OF RETURN BE ESTABLISHED FOR A PUBLIC UTILITY?

A. In a competitive industry, the return on a firm's common equity capital is determined through the competitive market for its goods and services. Due to the capital requirements needed to provide utility services and the economic benefit to society

from avoiding duplication of these services, some public utilities are monopolies. Because of the lack of competition and the essential nature of their services, it is not appropriate to permit monopoly utilities to set their own prices. Thus, regulation seeks to establish prices that are fair to consumers and, at the same time, sufficient to meet the operating and capital costs of the utility (i.e., provide an adequate return on capital to attract investors).

Q. PLEASE PROVIDE AN OVERVIEW OF THE COST OF CAPITAL IN THE CONTEXT OF THE THEORY OF THE FIRM.

A. The total cost of operating a business includes the cost of capital. The cost of common equity capital is the expected return on a firm's common stock that the marginal investor would deem sufficient to compensate for risk and the time value of money. In equilibrium, the expected and required rates of return on a company's common stock are equal.

Normative economic models of a company or firm, developed under very restrictive assumptions, provide insight into the relationship between firm performance or profitability, capital costs, and the value of the firm. Under the economist's ideal model of perfect competition, where entry and exit are costless, products are undifferentiated, and there are increasing marginal costs of production, firms produce up to the point where price equals marginal cost. Over time, a long-run equilibrium is established where price equals average cost, including the firm's capital costs. In equilibrium, total revenues equal total costs, and because capital costs represent investors' required return on the firm's capital, actual returns equal

required returns, and the market value must equal the book value of the firm's securities.

In the real world, firms can achieve competitive advantage due to product market imperfections. Most notably, companies can gain competitive advantage through product differentiation (adding real or perceived value to products) and by achieving economies of scale (decreasing marginal costs of production). Competitive advantage allows firms to price products above average cost and thereby earn accounting profits greater than those required to cover capital costs. When these profits are in excess of that required by investors, or when a firm earns a return on equity in excess of its cost of equity, investors respond by valuing the firm's equity in excess of its book value.

James M. McTaggart, founder of the international management consulting firm Marakon Associates, described this essential relationship between the return on equity, the cost of equity, and the market-to-book ratio in the following manner:[19]

> Fundamentally, the value of a company is determined by the cash flow it generates over time for its owners, and the minimum acceptable rate of return required by capital investors. This "cost of equity capital" is used to discount the expected equity cash flow, converting it to a present value. The cash flow is, in turn, produced by the interaction of a company's return on equity and the annual rate of equity growth. High return on equity (ROE) companies in low-growth markets, such as Kellogg, are prodigious generators of cash flow, while low ROE companies in high-growth markets, such as Texas Instruments, barely generate enough cash flow to finance growth.

[19] James M. McTaggart, "The Ultimate Poison Pill: Closing the Value Gap," *Commentary* (Spring 1986), p.3.

> A company's ROE over time, relative to its cost of equity, also determines whether it is worth more or less than its book value. If its ROE is consistently greater than the cost of equity capital (the investor's minimum acceptable return), the business is economically profitable and its market value will exceed book value. If, however, the business earns an ROE consistently less than its cost of equity, it is economically unprofitable and its market value will be less than book value.

As such, the relationship between a firm's return on equity, cost of equity, and market-to-book ratio is relatively straightforward. A firm that consistently earns a return on equity above its cost of equity will see its common stock sell at a price above its book value. Conversely, a firm that consistently earns a return on equity below its cost of equity will see its common stock sell at a price below its book value.

Q. PLEASE PROVIDE ADDITIONAL INSIGHTS INTO THE RELATIONSHIP BETWEEN RETURN ON EQUITY (ROE) AND MARKET-TO-BOOK RATIOS.

A. This relationship is discussed in a classic Harvard Business School case study entitled "Note on Value Drivers." On page 2 of that case study, the author describes the relationship very succinctly:[20]

[20] Benjamin Esty, "Note on Value Drivers," Harvard Business School, Case No. 9-297-082, April 7, 1997.

> For a given industry, more profitable firms – those able to generate higher returns per dollar of equity– should have higher market-to-book ratios. Conversely, firms which are unable to generate returns in excess of their cost of equity should sell for less than book value.

Profitability	*Value*
If ROE > K	*then Market/Book > 1*
If ROE = K	*then Market/Book =1*
If ROE < K	*then Market/Book < 1*

To assess the relationship by industry, as suggested above, I performed a regression study between estimated ROE and market-to-book ratios using natural gas distribution, electric utility, and water utility companies. I used all companies in these three industries that are covered by *Value Line* and have estimated ROE and market-to-book ratio data. The results are presented in Panels A-C of Exhibit JRW-6. The average R-squares for the electric, gas, and water companies are 0.78, 0.63, and 0.49, respectively.[21] This demonstrates the strong positive relationship between ROEs and market-to-book ratios for public utilities.

Q. WHAT ECONOMIC FACTORS HAVE AFFECTED THE COST OF EQUITY CAPITAL FOR PUBLIC UTILITIES?

A. Exhibit JRW-7 provides indicators of public utility equity cost rates over the past decade.

Page 1 shows the yields on long-term A-rated rated public utility bonds. These yields decreased from 2000 until 2003, and then hovered in the 5.50%-6.50%

[21] R-square measures the percent of variation in one variable (e.g., market-to-book ratios) explained by another variable (e.g., expected ROE). R-squares vary between zero and 1.0, with values closer to 1.0 indicating a higher relationship between two variables.

range from mid-2003 until mid-2008. These yields spiked up to the 7.75% range with the onset of the financial crisis, and remained high and volatile until early 2009. These yields declined to about 4.0% in the last half of 2012, increased to almost 5.0% in late 2013, and have declined to below 4.0% in 2016.

Page 2 provides the dividend yields for the Gas Proxy Group over the past decade. The dividend yields for this group have declined slightly over the decade. The Gas Proxy Group yields declined from the year 2000 to 2007, bottomed out at 3.75% in 2007, increased to 4.2% in 2009, and have since declined to about 3.0% as of 2015.

Average earned returns on common equity and market-to-book ratios for the Gas Proxy Group are on page 3 of Exhibit JRW-7. For the group, earned returns on common equity peaked at about 12.0% in 2006 and have since declined to about 10.0%. Over the past decade, the average market-to-book ratios for this group have ranged from 1.50X to 1.80X, with a 2015 reading of 1.78X.

Q. WHAT FACTORS DETERMINE INVESTORS' EXPECTED OR REQUIRED RATE OF RETURN ON EQUITY?

A. The expected or required rate of return on common stock is a function of market-wide as well as company-specific factors. The most important market factor is the time value of money as indicated by the level of interest rates in the economy. Common stock investor requirements generally increase and decrease with like changes in interest rates. The perceived risk of a firm is the predominant factor that influences investor return requirements on a company-specific basis. A firm's investment risk is

often separated into business and financial risk. Business risk encompasses all factors that affect a firm's operating revenues and expenses. Financial risk results from incurring fixed obligations in the form of debt in financing its assets.

Q. HOW DOES THE INVESTMENT RISK OF UTILITIES COMPARE WITH THAT OF OTHER INDUSTRIES?

A. Due to the essential nature of their service, as well as their regulated status, public utilities are exposed to a lesser degree of business risk than other, non-regulated businesses. The relatively low level of business risk allows public utilities to meet much of their capital requirements through borrowing in the financial markets, thereby incurring greater than average financial risk. Nonetheless, the overall investment risk of public utilities is below most other industries.

Exhibit JRW-8 provides an assessment of investment risk for 97 industries as measured by beta, which according to modern capital market theory, is the only relevant measure of investment risk. These betas come from the *Value Line Investment Survey.* The betas range from a high of 1.62 for the petroleum (producing) industry to a low of 0.68 for electric utilities (Eastern U.S.). The study shows that the investment risk of utilities is very low. In fact, the lowest betas are for electric utilities (Eastern U.S., Central U.S., and Western U.S.), natural gas utility, and water utility. The average betas for electric, water, and gas utility companies are 0.72, 0.74, and 0.71, respectively. As such, the cost of equity for utilities is among the lowest of all industries in the U.S.

Q. HOW CAN THE EXPECTED OR REQUIRED RATE OF RETURN ON COMMON EQUITY CAPITAL BE DETERMINED?

A. The costs of debt and preferred stock are normally based on historical or book values and can be determined with a great degree of accuracy. The cost of common equity capital, however, cannot be determined precisely and must instead be estimated from market data and informed judgment. This return to the stockholder should be commensurate with returns on investments in other enterprises having comparable risks.

According to valuation principles, the present value of an asset equals the discounted value of its expected future cash flows. Investors discount these expected cash flows at their required rate of return that, as noted above, reflects the time value of money and the perceived riskiness of the expected future cash flows. As such, the cost of common equity is the rate at which investors discount expected cash flows associated with common stock ownership.

Models have been developed to ascertain the cost of common equity capital for a firm. Each model, however, has been developed using restrictive economic assumptions. Consequently, judgment is required in selecting appropriate financial valuation models to estimate a firm's cost of common equity capital, in determining the data inputs for these models, and in interpreting the models' results. All of these decisions must take into consideration the firm involved as well as current conditions in the economy and the financial markets.

Q. HOW DO YOU PLAN TO ESTIMATE THE COST OF EQUITY CAPITAL FOR THE COMPANY?

A. I rely primarily on the discounted cash flow ("DCF") model to estimate the cost of equity capital. Given the investment valuation process and the relative stability of the utility business, I believe that the DCF model provides the best measure of equity cost rates for public utilities. It is my experience that this Commission has traditionally relied on the DCF model. I have also performed a capital asset pricing model ("CAPM") study; however, I give these results less weight because I believe that risk premium studies, of which the CAPM is one form, provide a less reliable indication of equity cost rates for public utilities.

B. DCF Analysis

Q. PLEASE DESCRIBE THE THEORY BEHIND THE TRADITIONAL DCF MODEL.

A. According to the DCF model, the current stock price is equal to the discounted value of all future dividends that investors expect to receive from investment in the firm. As such, stockholders' returns ultimately result from current as well as future dividends. As owners of a corporation, common stockholders are entitled to a *pro rata* share of the firm's earnings. The DCF model presumes that earnings that are not paid out in the form of dividends are reinvested in the firm so as to provide for future growth in earnings and dividends. The rate at which investors discount future dividends, which reflects the timing and riskiness of the expected cash flows, is

interpreted as the market's expected or required return on the common stock. Therefore, this discount rate represents the cost of common equity. Algebraically, the DCF model can be expressed as:

$$P = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \ldots \frac{D_n}{(1+k)^n}$$

where P is the current stock price, D_n is the dividend in year n, and k is the cost of common equity.

Q. IS THE DCF MODEL CONSISTENT WITH VALUATION TECHNIQUES EMPLOYED BY INVESTMENT FIRMS?

A. Yes. Virtually all investment firms use some form of the DCF model as a valuation technique. One common application for investment firms is called the three-stage DCF or dividend discount model ("DDM"). The stages in a three-stage DCF model are presented in Exhibit JRW-9, Page 1 of 2. This model presumes that a company's dividend payout progresses initially through a growth stage, then proceeds through a transition stage, and finally assumes a maturity (or steady-state) stage. The dividend-payment stage of a firm depends on the profitability of its internal investments which, in turn, is largely a function of the life cycle of the product or service.

1. Growth stage: Characterized by rapidly expanding sales, high profit margins, and an abnormally high growth in earnings per share. Because of highly profitable expected investment opportunities, the payout ratio is low. Competitors are attracted by the unusually high earnings, leading to a decline in the growth rate.

2. Transition stage: In later years, increased competition reduces profit margins and earnings growth slows. With fewer new investment opportunities, the company begins to pay out a larger percentage of earnings.

3. Maturity (steady-state) stage: Eventually, the company reaches a position where its new investment opportunities offer, on average, only slightly attractive ROEs. At that time, its earnings growth rate, payout ratio, and ROE stabilize for the remainder of its life. The constant-growth DCF model is appropriate when a firm is in the maturity stage of the life cycle.

In using this model to estimate a firm's cost of equity capital, dividends are projected into the future using the different growth rates in the alternative stages, and then the equity cost rate is the discount rate that equates the present value of the future dividends to the current stock price.

Q. HOW DO YOU ESTIMATE STOCKHOLDERS' EXPECTED OR REQUIRED RATE OF RETURN USING THE DCF MODEL?

A. Under certain assumptions, including a constant and infinite expected growth rate, and constant dividend/earnings and price/earnings ratios, the DCF model can be simplified to the following:

$$P = \frac{D_1}{k - g}$$

where D_1 represents the expected dividend over the coming year and g is the expected growth rate of dividends. This is known as the constant-growth version of the DCF

model. To use the constant-growth DCF model to estimate a firm's cost of equity, one solves for k in the above expression to obtain the following:

$$k = \frac{D_1}{P} + g$$

Q. IN YOUR OPINION, IS THE CONSTANT-GROWTH DCF MODEL APPROPRIATE FOR PUBLIC UTILITIES?

A. Yes. The economics of the public utility business indicate that the industry is in the steady-state or constant-growth stage of a three-stage DCF. The economics include the relative stability of the utility business, the maturity of the demand for public utility services, and the regulated status of public utilities (especially the fact that their returns on investment are effectively set through the ratemaking process). The DCF valuation procedure for companies in this stage is the constant-growth DCF. In the constant-growth version of the DCF model, the current dividend payment and stock price are directly observable. However, the primary problem and controversy in applying the DCF model to estimate equity cost rates entails estimating investors' expected dividend growth rate.

Q. WHAT FACTORS SHOULD ONE CONSIDER WHEN APPLYING THE DCF METHODOLOGY?

A. One should be sensitive to several factors when using the DCF model to estimate a firm's cost of equity capital. In general, one must recognize the assumptions under which the DCF model was developed in estimating its components (the dividend

yield and the expected growth rate). The dividend yield can be measured precisely at any point in time; however, it tends to vary somewhat over time. Estimation of expected growth is considerably more difficult. One must consider recent firm performance, in conjunction with current economic developments and other information available to investors, to accurately estimate investors' expectations.

Q. WHAT DIVIDEND YIELDS HAVE YOU REVIEWED?

A. I have calculated the dividend yields for the companies in the proxy group using the current annual dividend and the 30-day, 90-day, and 180-day average stock prices. These dividend yields are provided on page 2 of Exhibit JRW-10. For the Gas Proxy Group, the median dividend yields using the 30-day, 90-day, and 180-day average stock prices range from 2.7% to 2.9%. Given this range, I use 2.80% as the dividend yield for the Gas Proxy Group.

Q. PLEASE DISCUSS THE APPROPRIATE ADJUSTMENT TO THE SPOT DIVIDEND YIELD.

A. According to the traditional DCF model, the dividend yield term relates to the dividend yield over the coming period. As indicated by Professor Myron Gordon, who is commonly associated with the development of the DCF model for popular use, this is obtained by: (1) multiplying the expected dividend over the coming quarter by 4, and (2) dividing this dividend by the current stock price to determine the appropriate dividend yield for a firm that pays dividends on a quarterly basis.[22]

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[22] *Petition for Modification of Prescribed Rate of Return*, Federal Communications Commission, Docket No.

In applying the DCF model, some analysts adjust the current dividend for growth over the coming year as opposed to the coming quarter. This can be complicated, because firms tend to announce changes in dividends at different times during the year. As such, the dividend yield computed based on presumed growth over the coming quarter as opposed to the coming year can be quite different. Consequently, it is common for analysts to adjust the dividend yield by some fraction of the long-term expected growth rate.

Q. GIVEN THIS DISCUSSION, WHAT ADJUSTMENT FACTOR DO YOU USE FOR YOUR DIVIDEND YIELD?

A. I adjust the dividend yield by one-half (1/2) of the expected growth so as to reflect growth over the coming year.

Q. PLEASE DISCUSS THE GROWTH RATE COMPONENT OF THE DCF MODEL.

A. There is much debate as to the proper methodology to employ in estimating the growth component of the DCF model. By definition, this component is investors' expectation of the long-term dividend growth rate. Presumably, investors use some combination of historical and/or projected growth rates for earnings and dividends per share and for internal or book value growth to assess long-term potential.

79-05, Direct Testimony of Myron J. Gordon and Lawrence I. Gould at 62 (April 1980).

Q. WHAT GROWTH DATA HAVE YOU REVIEWED FOR THE PROXY GROUP?

A. I have analyzed a number of measures of growth for companies in the proxy group. I reviewed *Value Line's* historical and projected growth rate estimates for earnings per share ("EPS"), dividends per share ("DPS"), and book value per share ("BVPS"). In addition, I utilized the average EPS growth rate forecasts of Wall Street analysts as provided by Yahoo, Reuters and Zacks. These services solicit five-year earnings growth rate projections from securities analysts and compile and publish the means and medians of these forecasts. Finally, I also assessed prospective growth as measured by prospective earnings retention rates and earned returns on common equity.

Q. PLEASE DISCUSS HISTORICAL GROWTH IN EARNINGS AND DIVIDENDS AS WELL AS INTERNAL GROWTH.

A. Historical growth rates for EPS, DPS, and BVPS are readily available to investors and are presumably an important ingredient in forming expectations concerning future growth. However, one must use historical growth numbers as measures of investors' expectations with caution. In some cases, past growth may not reflect future growth potential. Also, employing a single growth rate number (for example, for five or ten years) is unlikely to accurately measure investors' expectations, due to the sensitivity of a single growth rate figure to fluctuations in individual firm performance as well as overall economic fluctuations (i.e., business cycles). However, one must appraise the context in which the growth rate is being employed.

According to the conventional DCF model, the expected return on a security is equal to the sum of the dividend yield and the expected long-term growth in dividends. Therefore, to best estimate the cost of common equity capital using the conventional DCF model, one must look to long-term growth rate expectations.

Internally generated growth is a function of the percentage of earnings retained within the firm (the earnings retention rate) and the rate of return earned on those earnings (the return on equity). The internal growth rate is computed as the retention rate times the return on equity. Internal growth is significant in determining long-run earnings and, therefore, dividends. Investors recognize the importance of internally generated growth and pay premiums for stocks of companies that retain earnings and earn high returns on internal investments.

Q. PLEASE DISCUSS THE SERVICES THAT PROVIDE ANALYSTS' EPS FORECASTS.

A. Analysts' EPS forecasts for companies are collected and published by a number of different investment information services, including Institutional Brokers Estimate System ("I/B/E/S"), Bloomberg, FactSet, Zacks, First Call and Reuters, among others. Thompson Reuters publishes analysts' EPS forecasts under different product names, including I/B/E/S, First Call, and Reuters. Bloomberg, FactSet, and Zacks publish their own set of analysts' EPS forecasts for companies. These services do not reveal: (1) the analysts who are solicited for forecasts; or (2) the identity of the analysts who actually provide the EPS forecasts that are used in the compilations published by the services. I/B/E/S, Bloomberg, FactSet, and First Call are fee-based services. These services

usually provide detailed reports and other data in addition to analysts' EPS forecasts. Thompson Reuters and Zacks do provide limited EPS forecasts data free-of-charge on the internet. Yahoo finance (http://finance.yahoo.com) lists Thompson Reuters as the source of its summary EPS forecasts. The Reuters website (www.reuters.com) also publishes EPS forecasts from Thompson Reuters, but with more detail. Zacks (www.zacks.com) publishes its summary forecasts on its website. Zack's estimates are also available on other websites, such as msn.money (http://money.msn.com).

Q. PLEASE PROVIDE AN EXAMPLE OF THESE EPS FORECASTS.

A. The following example provides the EPS forecasts compiled by Reuters for Atmos Energy Corp. (stock symbol "ATO"). The figures are provided on page 2 of Exhibit JRW-9. The top line shows that six analysts have provided EPS estimates for the quarter ending June 30, 2016. The mean, high, and low estimates are $.059, $0.61, and $0.56, respectively. The second line shows the quarterly EPS estimates for the quarter ending September 30, 2016 of $0.33 (mean), $0.38 (high), and $0.28 (low). Lines three and four show the annual EPS estimates for the fiscal years ending September 2016 ($3.29 (mean), $3.34 (high), and $3.20 (low)) and September 2017 (($3.52 (mean), $3.57 (high), and $3.45 (low)). The quarterly and annual EPS forecasts in lines 1-4 are expressed in dollars and cents. As in the ATO case shown here, it is common for more analysts to provide estimates of annual EPS as opposed to quarterly EPS. The bottom line shows the projected long-term EPS growth rate, which is expressed as a percentage. For ATO, two analysts have provided long-term

EPS growth rate forecasts, with mean, high, and low growth rates of 7.30%, 7.60%, and 7.00%, respectively.

Q. WHICH OF THESE EPS FORECASTS IS USED IN DEVELOPING A DCF GROWTH RATE?

A. The DCF growth rate is the long-term projected growth rate in EPS, DPS, and BVPS. Therefore, in developing an equity cost rate using the DCF model, the projected long-term growth rate is the projection used in the DCF model.

Q. WHY DO YOU NOT RELY EXCLUSIVELY ON THE EPS FORECASTS OF WALL STREET ANALYSTS IN ARRIVING AT A DCF GROWTH RATE FOR THE PROXY GROUP?

A. There are several issues with using the EPS growth rate forecasts of Wall Street analysts as DCF growth rates. First, the appropriate growth rate in the DCF model is the dividend growth rate, not the earnings growth rate. Nonetheless, over the very long-term, dividend and earnings will have to grow at a similar growth rate. Therefore, consideration must be given to other indicators of growth, including prospective dividend growth, internal growth, as well as projected earnings growth. Second, a recent study by Lacina, Lee, and Xu (2011) has shown that analysts' three- to five-year earnings growth rate forecasts are not more accurate at forecasting future earnings than naïve random walk forecasts of future earnings.[23] Employing data over

[23] M. Lacina, B. Lee & Z. Xu, "An Evaluation of Financial Analysts and Naïve Methods in Forecasting Long-term Earnings', Kenneth D. Lawrence, Ronald K. Klimberg (ed.), Emerald Group Publishing Limited, *Advances in Business and Management Forecasting (Vol. 8),* pp. 77-101.

a twenty-year period, these authors demonstrate that using the most recent one year's EPS figure to forecast EPS in the next 3-5 years proved to be just as accurate as using the EPS estimates from analysts' long-term earnings growth rate forecasts. In the authors' opinion, these results indicate that analysts' long-term earnings growth rate forecasts should be used with caution as inputs for valuation and cost of capital purposes. Finally, and most significantly, it is well known that the long-term EPS growth rate forecasts of Wall Street securities analysts are overly optimistic and upwardly biased. This has been demonstrated in a number of academic studies over the years. This issue is discussed at length in Exhibit JRW-16, Appendix B of this testimony. Hence, using these growth rates as a DCF growth rate will provide an overstated equity cost rate. On this issue, a study by Easton and Sommers (2007) found that optimism in analysts' growth rate forecasts leads to an upward bias in estimates of the cost of equity capital of almost 3.0 percentage points.[24]

Q. IS IT YOUR OPINION THAT STOCK PRICES REFLECT THE UPWARD BIAS IN THE EPS GROWTH RATE FORECASTS?

A. Yes, I believe that investors are well aware of the bias in analysts' EPS growth rate forecasts, and therefore, stock prices reflect the upward bias.

Q. HOW DOES THAT AFFECT THE USE OF THESE FORECASTS IN A DCF EQUITY COST RATE STUDY?

A. According to the DCF model, the equity cost rate is a function of the dividend yield and

[24] Peter D. Easton & Gregory A. Sommers, *Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts*, 45 J. ACCT. RES. 983–1015 (August 2006).

expected growth rate. Since stock prices reflect the bias, it would affect the dividend yield. In addition, the DCF growth rate needs to be adjusted downward from the projected EPS growth rate to reflect the upward bias.

Q. PLEASE DISCUSS THE HISTORICAL GROWTH OF THE COMPANIES IN THE PROXY GROUP, AS PROVIDED BY *VALUE LINE.*

A. Page 3 of Exhibit JRW-10 provides the 5- and 10-year historical growth rates for EPS, DPS, and BVPS for the companies in the proxy group, as published in the *Value Line Investment Survey.* The median historical growth measures for EPS, DPS, and BVPS for the Gas Proxy Group, as provided in Panel A, range from 3.5% to 6.5%, with an average of 5.3%.

Q. PLEASE SUMMARIZE *VALUE LINE'S* PROJECTED GROWTH RATES FOR THE COMPANIES IN THE PROXY GROUP.

A. *Value Line's* projections of EPS, DPS and BVPS growth for the companies in the proxy group are shown on page 4 of Exhibit JRW-10. As stated above, due to the presence of outliers, the medians are used in the analysis. For the Gas Proxy Group, as shown in Panel A of page 4 of Exhibit JRW-10, the medians range from 4.8% to 6.5%, with an average of 5.5%.

Also provided on page 4 of Exhibit JRW-10 are the prospective sustainable growth rates for the companies in the proxy group as measured by *Value Line*'s average projected retention rate and return on shareholders' equity. As noted above,

sustainable growth is a significant and a primary driver of long-run earnings growth. For the Gas Proxy Group, the median prospective sustainable growth rate is 5.0%.

Q. PLEASE ASSESS GROWTH FOR THE PROXY GROUP AS MEASURED BY ANALYSTS' FORECASTS OF EXPECTED 5-YEAR EPS GROWTH.

A. Yahoo, Zacks, and Reuters collect, summarize, and publish Wall Street analysts' long-term EPS growth rate forecasts for the companies in the proxy group. These forecasts are provided for the companies in the proxy group on page 5 of Exhibit JRW-10. I have reported both the mean and median growth rates for the group. The mean/median of analysts' projected EPS growth rates for the Gas Proxy Group are 5.7%/5.6%. Since there is considerable overlap in analyst coverage between the three services, and not all of the companies have forecasts from the different services, I have averaged the expected five-year EPS growth rates from the three services for each company to arrive at an expected EPS growth rate by company.

Q. PLEASE SUMMARIZE YOUR ANALYSIS OF THE HISTORICAL AND PROSPECTIVE GROWTH OF THE PROXY GROUP.

A. Page 6 of Exhibit JRW-10 shows the summary DCF growth rate indicators for the proxy group.

The historical growth rate indicators for the Gas Proxy Group imply a baseline growth rate of 5.3%. The average of the projected EPS, DPS, and BVPS growth rates from *Value Line* is 5.5%, and *Value Line*'s projected sustainable growth rate is 5.0%. At the high end of the range for the Gas Proxy Group are the projected EPS growth

rates of Wall Street analysts, which are 5.7% and 5.6% as measured by the mean and median growth rates. The overall range for the projected growth rate indicators is 5.0% to 5.7%. Giving more weight to the projected EPS growth rate of Wall Street analysts, I believe that a growth rate of 5.6% is appropriate. This growth rate figure is clearly in the upper end of the range of historic and projected growth rates for the Gas Proxy Group.

Q. BASED ON THE ABOVE ANALYSIS, WHAT ARE YOUR INDICATED COMMON EQUITY COST RATES FROM THE DCF MODEL FOR THE PROXY GROUP?

A. My DCF-derived equity cost rates for the group are summarized on page 1 of Exhibit JRW-10 and in the table below.

Table 1
DCF Results

	Dividend Yield	1 + ½ Growth Adjustment	DCF Growth Rate	Equity Cost Rate
Gas Proxy Group	**2.80%**	**1.028**	**5.60%**	**8.50%**

The DCF calculation for my Gas Proxy Group is the 2.80% dividend yield, times the 1 and ½ growth adjustment factor of 1.028, plus the DCF growth rate of 5.60%, which results in an equity cost rate of 8.50%.

C. Capital Asset Pricing Model

Q. PLEASE DISCUSS THE CAPITAL ASSET PRICING MODEL ("CAPM").

A. The CAPM is a risk premium approach to gauging a firm's cost of equity capital. According to the risk premium approach, the cost of equity is the sum of the interest rate on a risk-free bond (R_f) and a risk premium (RP), as in the following:

$$k = R_f + RP$$

The yield on long-term U.S. Treasury securities is normally used as R_f. Risk premiums are measured in different ways. The CAPM is a theory of the risk and expected returns of common stocks. In the CAPM, two types of risk are associated with a stock: firm-specific risk or unsystematic risk, and market or systematic risk, which is measured by a firm's beta. The only risk that investors receive a return for bearing is systematic risk.

According to the CAPM, the expected return on a company's stock, which is also the equity cost rate (K), is equal to:

$$K = (R_f) + ß * [E(R_m) - (R_f)]$$

Where:

- K represents the estimated rate of return on the stock;
- $E(R_m)$ represents the expected return on the overall stock market. Frequently, the 'market' refers to the S&P 500;
- (R_f) represents the risk-free rate of interest;
- $[E(R_m) - (R_f)]$ represents the expected equity or market risk premium—the excess return that an investor expects to receive above the risk-free rate for investing in risky stocks; and
- *Beta*—(ß) is a measure of the systematic risk of an asset.

To estimate the required return or cost of equity using the CAPM requires three inputs: the risk-free rate of interest (R_f), the beta (ß), and the expected equity or market risk premium $[E(R_m) - (R_f)]$. R_f is the easiest of the inputs to measure – it is represented by the yield on long-term U.S. Treasury bonds. ß, the measure of systematic risk, is a little more difficult to measure because there are different opinions about what adjustments, if any, should be made to historical betas due to their tendency to regress to 1.0 over time. And finally, an even more difficult input to measure is the expected equity or market risk premium $(E(R_m) - (R_f))$. I will discuss each of these inputs below.

Q. PLEASE DISCUSS EXHIBIT JRW-11.

A. Exhibit JRW-11 provides the summary results for my CAPM study. Page 1 shows the results, and the following pages contain the supporting data.

Q. PLEASE DISCUSS THE RISK-FREE INTEREST RATE.

A. The yield on long-term U.S. Treasury bonds has routinely been viewed as the risk-free rate of interest in the CAPM. The yield on long-term U.S. Treasury bonds, in turn, has been considered to be the yield on U.S. Treasury bonds with 30-year maturities.

Q. WHAT RISK-FREE INTEREST RATE ARE YOU USING IN YOUR CAPM?

A. As shown on page 2 of Exhibit JRW-11, the yield on 30-year U.S. Treasury bonds has been in the 2.25% to 4.0% range over the 2013–2016 time period. The 30-year

Treasury yield is currently neat the lower end of this range. Given the recent range of yields and the possibility of higher interest rates, I use 4.0% as the risk-free rate, or R_f, in my CAPM.

Q. WHAT BETAS ARE YOU EMPLOYING IN YOUR CAPM?

A. Beta (ß) is a measure of the systematic risk of a stock. The market, usually taken to be the S&P 500, has a beta of 1.0. The beta of a stock with the same price movement as the market also has a beta of 1.0. A stock whose price movement is greater than that of the market, such as a technology stock, is riskier than the market and has a beta greater than 1.0. A stock with below average price movement, such as that of a regulated public utility, is less risky than the market and has a beta less than 1.0. Estimating a stock's beta involves running a linear regression of a stock's return on the market return.

As shown on page 3 of Exhibit JRW-11, the slope of the regression line is the stock's ß. A steeper line indicates that the stock is more sensitive to the return on the overall market. This means that the stock has a higher ß and greater-than-average market risk. A less steep line indicates a lower ß and less market risk.

Several online investment information services, such as Yahoo and Reuters, provide estimates of stock betas. Usually these services report different betas for the same stock. The differences are usually due to: (1) the time period over which ß is measured; and (2) any adjustments that are made to reflect the fact that betas tend to regress to 1.0 over time. In estimating an equity cost rate for the proxy groups, I am using the betas for the companies as provided in the *Value Line Investment Survey*.

As shown on page 3 of Exhibit JRW-11, the median beta for the companies in the Gas Proxy Group is 0.75.

Q. PLEASE DISCUSS THE MARKET RISK PREMIUM ("MRP").

A. The MRP is equal to the expected return on the stock market (e.g., the expected return on the S&P 500, $E(R_m)$ minus the risk-free rate of interest (R_f)). The MRP is the difference in the expected total return between investing in equities and investing in "safe" fixed-income assets, such as long-term government bonds. However, while the MRP is easy to define conceptually, it is difficult to measure because it requires an estimate of the expected return on the market - $E(R_m)$. As is discussed below, there are different ways to measure $E(R_m)$, and various studies have come up with significantly different magnitudes for $E(R_m)$. As Merton Miller, the 1990 Nobel Prize winner in economics indicated, $E(R_m)$ is very difficult to measure and is one of the great mysteries in finance.[25]

Q. PLEASE DISCUSS THE ALTERNATIVE APPROACHES TO ESTIMATING THE MRP.

A. Page 4 of Exhibit JRW-11 highlights the primary approaches to, and issues in, estimating the expected MRP. The traditional way to measure the MRP was to use the difference between historical average stock and bond returns. In this case, historical stock and bond returns, also called *ex post* or backward looking returns,

[25] Merton Miller, "The History of Finance: An Eyewitness Account," *Journal of Applied Corporate Finance*, 2000, P. 3.

were used as the measures of the market's expected return also known as the *ex ante* or forward-looking expected return. This type of historical evaluation of stock and bond returns is often called the "Ibbotson approach" after Professor Roger Ibbotson, who popularized this method of using historical financial market returns as measures of expected returns. Most historical assessments of the equity risk premium suggest an equity risk premium range of 5% to 7% above the rate on long-term U.S. Treasury bonds. However, this can be a problem because: (1) *ex post* returns are not the same as *ex ante* expectations; (2) market risk premiums can change over time, increasing when investors become more risk-averse and decreasing when investors become less risk-averse; and (3) market conditions can change such that ex post historical returns are poor estimates of *ex ante* expectations.

The use of historical returns as market expectations has been criticized in numerous academic studies as discussed later in my testimony. The general theme of these studies is that the large equity risk premium discovered in historical stock and bond returns cannot be justified by the fundamental data. These studies, which fall under the category "Ex Ante Models and Market Data," compute *ex ante* expected returns using market data to arrive at an expected equity risk premium. These studies have also been called "Puzzle Research" after the famous study by Mehra and Prescott in which the authors first questioned the magnitude of historical equity risk premiums relative to fundamentals.[26]

In addition, there are a number of surveys of financial professionals regarding the MRP. There have also been several published surveys of academics on the equity

[26] Rajnish Mehra & Edward C. Prescott, "The Equity Premium: A Puzzle," *Journal of Monetary Economics,* 145 (1985).

risk premium. *CFO Magazine* conducts a quarterly survey of CFOs, which includes questions regarding their views on the current expected returns on stocks and bonds. Over 500 CFOs normally participate in the survey.[27] Questions regarding expected stock and bond returns are also included in the Federal Reserve Bank of Philadelphia's annual survey of financial forecasters, which is published as the *Survey of Professional Forecasters*.[28] This survey of professional economists has been published for almost fifty years. In addition, Pablo Fernandez conducts annual surveys of financial analysts and companies regarding the equity risk premiums they use in their investment and financial decision-making.[29]

Q. PLEASE PROVIDE A SUMMARY OF THE MARKET RISK PREMIUM STUDIES.

A. Derrig and Orr (2003), Fernandez (2007), and Song (2007) have completed the most comprehensive reviews to date of the research on the MRP.[30] Derrig and Orr's study evaluated the various approaches to estimating MRPs, as well as the issues with the alternative approaches and summarized the findings of the published research on the MRP. Fernandez examined four alternative measures of the MRP – historical,

[27] *See* Duke/CFO Magazine Global Business Outlook Survey, www.cfosurvey.org.

[28] Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters (Feb, 2016).* The Survey of Professional Forecasters was formerly conducted by the American Statistical Association ("ASA") and the National Bureau of Economic Research ("NBER") and was known as the ASA/NBER survey. The survey, which began in 1968, is conducted each quarter. The Federal Reserve Bank of Philadelphia, in cooperation with the NBER, assumed responsibility for the survey in June 1990.

[29] Pablo Fernandez, Alberto Ortiz and Isabel Fernandez Acín, "Market Risk Premium used in 71 countries in 2016: A survey with 6,932 answers," May 9, 2016.

[30] *See* Richard Derrig & Elisha Orr, "Equity Risk Premium: Expectations Great and Small," Working Paper (version 3.0), Automobile Insurers Bureau of Massachusetts, (August 28, 2003); Pablo Fernandez, "Equity Premium: Historical, Expected, Required, and Implied," IESE Business School Working Paper, (2007); Zhiyi Song, "The Equity Risk Premium: An Annotated Bibliography," CFA Institute, (2007).

expected, required, and implied. He also reviewed the major studies of the MRP and presented the summary MRP results. Song provides an annotated bibliography and highlights the alternative approaches to estimating the MRP.

Page 5 of Exhibit JRW-11 provides a summary of the results of the primary risk premium studies reviewed by Derrig and Orr, Fernandez, and Song, as well as other more recent studies of the MRP. In developing page 5 of Exhibit JRW-11, I have categorized the studies as discussed on page 4 of Exhibit JRW-11. I have also included the results of studies of the "Building Blocks" approach to estimating the equity risk premium. The Building Blocks approach is a hybrid approach employing elements of both historical and *ex ante* models.

Q. PLEASE DISCUSS PAGE 5 OF EXHIBIT JRW-11.

A. Page 5 of JRW-11 provides a summary of the results of the MRP studies that I have reviewed. These include the results of: (1) the various studies of the historical risk premium, (2) *ex ante* MRP studies, (3) MRP surveys of CFOs, financial forecasters, analysts, companies and academics, and (4) the Building Blocks approach to the MRP. There are results reported for over thirty studies, and the median MRP is 4.63%.

Q. PLEASE HIGHLIGHT THE RESULTS OF THE MORE RECENT RISK PREMIUM STUDIES AND SURVEYS.

A. The studies cited on page 5 of Exhibit JRW-11 include every MRP study and survey I could identify that was published over the past decade and that provided an MRP

estimate. Most of these studies were published prior to the financial crisis. In addition, some of these studies were published in the early 2000s at the market peak. It should be noted that many of these studies (as indicated) used data over long periods of time (as long as fifty years of data) and so were not estimating an MRP as of a specific point in time (e.g., the year 2001). To assess the effect of the earlier studies on the MRP, I have reconstructed page 5 of Exhibit JRW-11 on page 6 of Exhibit JRW-11; however, I have eliminated all studies dated before January 2, 2010. The median for this subset of studies is 5.03%.

Q. GIVEN THESE RESULTS, WHAT MRP ARE YOU USING IN YOUR CAPM?

A. Much of the data indicates that the market risk premium is in the 4.0% to 6.0% range. Several recent studies (such as Damodaran, American Appraisers, Duff & Phelps, Duarte and Rosa, and the CFO Survey) have suggested an increase in the market risk premium. Therefore, I will use 5.5%, which is in the upper end of the range, as the market risk premium or MRP.

Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPS USED BY CFOS?

A. Yes. In the June 2016 CFO survey conducted by *CFO Magazine* and Duke University, which included approximately 450 responses, the expected 10-year MRP was 4.55%.[31]

[31] Duke/CFO Magazine Global Business Outlook Survey, www.cfosurvey.org, June, 2016.

Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPS OF PROFESSIONAL FORECASTERS?

A. The financial forecasters in the previously referenced Federal Reserve Bank of Philadelphia survey projected both stock and bond returns. In the February 2016 survey, the median long-term expected stock and bond returns were 5.34% and 3.44%, respectively. This provides an *ex ante* MRP of 1.90% (5.34% minus 3.44%). As such, my MRP is larger than that forecasted by the professional forecasters.

Q. IS YOUR *EX ANTE* MRP CONSISTENT WITH THE MRPs OF FINANCIAL ADVISORS?

A. Yes. Duff & Phelps is a well-known valuation and corporate finance advisor that publishes extensively on the cost of capital. As of 2016, Duff & Phelps recommended using a 5.5% MRP for the U.S.[32]

Q. WHAT EQUITY COST RATE IS INDICATED BY YOUR CAPM ANALYSIS?

A. The results of my CAPM study for the proxy group are summarized on page 1 of Exhibit JRW-11 and in the table below.

Table 2
CAPM Results
$K = (R_f) + ß * [E(R_m) - (R_f)]$

	Risk-Free Rate	Beta	Equity Risk Premium	Equity Cost Rate
Gas Proxy Group	**4.0%**	**0.75**	**5.5%**	**8.1%**

[32]http://www.duffandphelps.com/insights/publications/cost-of-capital/index.

For the Gas Proxy Group, the risk-free rate of 4.0% plus the product of the beta of 0.75 times the equity risk premium of 5.5% results in an 8.1% equity cost rate.

D. Equity Cost Rate Summary

Q. PLEASE SUMMARIZE YOUR EQUITY COST RATE STUDY.

A. My DCF and CAPM analyses for the Gas Proxy Group indicate equity cost rates of 8.50% and 8.10%, respectively.

Table 3
Equity Cost Rate Results

	DCF	CAPM
Gas Proxy Group	**8.50%**	**8.10%**

Q. GIVEN THESE RESULTS, WHAT IS YOUR ESTIMATED EQUITY COST RATE FOR THE GROUP?

A. Given these results, I conclude that the appropriate equity cost rate for companies in my Gas Proxy Group is in the 8.10% to 8.50% range. However, since I rely primarily on the DCF model, I am using the upper end of the range as the equity cost rate. Therefore, I conclude that the appropriate equity cost rate for KGS is 8.50%.

Q. PLEASE INDICATE WHY AN 8.50% RETURN IS APPROPRIATE FOR KGS AT THIS TIME.

A. There are a number of reasons why an 8.50% return on equity is appropriate and fair for KGS in this case.

First, as shown in Exhibit JRW-8, the utility industry is one of the lowest risk industries in the U.S. as measured by beta. As such, the cost of equity capital for this industry is amongst the lowest in the U.S., according to the CAPM.

Second, as shown in Exhibits JRW-2 and JRW-3, capital costs for utilities, as indicated by long-term bond yields, are still at historically low levels. Furthermore, as previously discussed, interest rates and utility bond yields have decreased since the Federal Reserve ended its QEIII program in October, 2014.

Third, as previously indicated, the authorized ROEs for gas distribution companies have gradually decreased in recent years. These authorized ROEs were 9.94% in 2012, 9.68% in 2013, 9.78% in 2014, 9.60% in 2015, and 9.45% in the first half of 2016, according to Regulatory Research Associates.[33] In my opinion, these authorized ROEs have lagged behind capital market cost rates. This has been especially true in recent years as some state commissions have been reluctant to authorize ROEs below 10%. However, the trend has been lower towards lower ROEs, and the norm now is below ten percent. Hence, I believe that my recommended ROE reflects our present historically low capital cost rates, and these low capital cost rates are finally being recognized by state utility commissions.

Q. PLEASE DISCUSS YOUR RECOMMENDATION IN LIGHT OF A RECENT MOODY'S PUBLICATION.

A. In 2015, Moody's published an article on utility ROEs and credit quality. In the article, Moody's recognizes that authorized ROEs for electric and gas companies are

[33] *Regulatory Focus*, Regulatory Research Associates, various dates.

declining due to lower interest rates. [34]

> The credit profiles of US regulated utilities will remain intact over the next few years despite our expectation that regulators will continue to trim the sector's profitability by lowering its authorized returns on equity (ROE). Persistently low interest rates and a comprehensive suite of cost recovery mechanisms ensure a low business risk profile for utilities, prompting regulators to scrutinize their profitability, which is defined as the ratio of net income to book equity. We view cash flow measures as a more important rating driver than authorized ROEs, and we note that regulators can lower authorized ROEs without hurting cash flow, for instance by targeting depreciation, or through special rate structures.

Moody's indicates that even with the lower authorized ROEs, electric and gas companies are earning ROEs of 9.0% to 10.0%; however, these lower authorized ROEs are not impairing their credit profiles and are not deterring them from raising record amounts of capital. With respect to authorized ROEs, Moody's recognizes that utilities and regulatory commissions are having trouble justifying higher ROEs in the face of lower interest rates and cost recovery mechanisms.[35]

> Robust cost recovery mechanisms will help ensure that US regulated utilities' credit quality remains intact over the next few years. As a result, falling authorized ROEs are not a material credit driver at this time, but rather reflect regulators' struggle to justify the cost of capital gap between the industry's authorized ROEs and persistently low interest rates. We also see utilities struggling to defend this gap, while at the same time recovering the vast majority of their costs and investments through a variety of rate mechanisms.

Overall, this article further supports the prevailing/emerging belief that lower authorized ROEs are unlikely to hurt the financial integrity of utilities or their ability

[34] Moody's Investors Service, "Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles," March 10, 2015, p. 3.
[35] Moody's Investors Service, "Lower Authorized Equity Returns Will Not Hurt Near-Term Credit Profiles," March 10, 2015, p. 2.

to attract capital.

Q. DO YOU BELIEVE THAT YOUR 8.50% ROE RECOMMENDATION MEETS *HOPE* AND *BLUEFIELD* STANDARDS?

A. Yes. As previously noted, according to the *Hope* and *Bluefield* decisions, returns on capital should be: (1) comparable to returns investors expect to earn on investments with similar risk; (2) sufficient to assure confidence in the company's financial integrity; and (3) adequate to maintain the company's credit and to attract capital. While my recommendation is below the average authorized ROEs for gas companies, it reflects the downward trend in authorized and earned ROEs of gas companies. As highlighted in the Moody's publication cited above, despite authorized and earned ROEs below 10%, the credit quality of electric and gas companies has not been impaired and, in fact, has improved because utilities are raising approximately $50 billion per year in capital. Major positive factors in the improved credit quality of utilities are regulatory ratemaking mechanisms. Therefore, I do believe that my ROE recommendation meets the criteria established in the *Hope* and *Bluefield* decisions.

VI. CRITIQUE OF KGS'S RATE OF RETURN TESTIMONY

Q. PLEASE SUMMARIZE DR. FAIRCHILD'S RATE OF RETURN RECOMMENDATION FOR KGS.

A. The Company has proposed a capital structure that includes 45.00% long-term debt and 55.00% common equity. KGS witness Dr. Fairchild recommends a common equity cost rate 10.00%.

Q. WHAT ISSUES DO YOU HAVE WITH THE COMPANY'S COST OF CAPITAL POSITION?

A. The most significant areas of disagreement in measuring KGS's cost of capital are:

1. The Company's proposed capital structure has more equity and less financial risk than other gas companies. As a result, I have used a capital structure consisting of 50% long-term debt and 50% common equity;

2. Dr. Fairchild assessment of capital market conditions is flawed. In providing guidance on capital costs and in estimating KGS's ROE, he has relied upon economists' interest rate forecasts. Despite dire and unfounded predictions of rising interest rates over the past decade, long-term interest rates and capital costs are still at historically low levels. As I discuss below, there are strong indicators from my assessment study of global capital markets that long-term capital costs will remain low;

3. Dr. Fairchild's DCF equity cost rate estimates are biased and are not reflected in his 10% ROE recommendation. In particular, (1) his DCF growth rate range of 5.5%

to 6.5% is overstated, in part because he has subjectively eliminated low-end DCF growth rates. This leads to an inflated DCF equity cost rate; and (2) even despite these eliminations and his overstated growth rate range, he has given his DCF results very little weight in arriving at his 10.0% ROE recommendation;

4. The historic and projected market or equity risk premiums in Dr. Fairchild's CAPM approach are not empirically sound and are not reflective of current market conditions and prospective earnings and economic growth; and

5. Dr. Fairchild's CE approach does not provide market-based estimate of KGS' cost on common equity capital.

Q. PLEASE REVIEW DR. FAIRCHILD'S EQUITY COST RATE APPROACHES AND RESULTS.

A. Dr. Fairchild uses his eight-company gas distribution company proxy group and employs DCF, CAPM, RP, and CE equity cost rate approaches. Dr. Fairchild's equity cost rate estimates for KGS are summarized in Exhibit JRW-13. Based on these figures, he concludes that the appropriate equity cost rate for the Company is 10.00%.

A. DCF Approach

Q. PLEASE SUMMARIZE DR. FAIRCHILD'S DCF ESTIMATES.

A. On pages 17-24 of his testimony and in Schedules BHF-1 - BHF-4, Dr. Fairchild develops an equity cost rate by applying the DCF model to his gas Group. Dr. Fairchild's DCF results are summarized in Panel A of Exhibit JRW-13. In the

traditional DCF approach, the equity cost rate is the sum of the dividend yield and expected growth. Dr. Fairchild computes a dividend yield using the stock prices of the proxy companies as of February, 2016, and uses *Value Line* projected dividend for each company over the next twelve months. For the DCF growth rate, Dr. Fairchild employs the projected EPS growth of Wall Street analysts as compiled by I/B/E/S and Zack's, *Value Line's* projected EPS growth rate. He also reviews *Value Line*'s projected as well as five- and ten- year historic growth rates for EPS, DPS and stock price. Based on these figures, he estimates a DCF growth rate in the range of 5.5% to 6.5%. With a dividend yield of 3.0% and an expected growth rate of 5.5% to 9.5%, his DCF equity cost rate for KGS is in the range of 8.5% to 9.5%.

Q. WHAT ARE THE ERRORS IN DR. FAIRCHILD'S DCF ANALYSES?

A. The primary issues in Dr. Fairchild's DCF analyses are: (1) his DCF growth rate range of 5.5% to 6.5% is overstated, in part because he has subjectively eliminated low-end DCF growth rates, and (2) even with his DCF growth rate inflated range and associated equity cost rates, he has given his DCF results very little weight in arriving at his 10.0% ROE recommendation;

1. <u>The Inflated DCF Growth Rate Range of 5.5% to 6.5%</u>

Q. PLEASE ADDRESS DR. FAIRCHILD'S DCF GROWTH RATE RANGE OF 5.5% TO 6.5%.

A. A significant error with Dr. Fairchild's constant- growth DCF equity cost rate analysis is his DCF growth rate range of 5.5% to 6.5%. He reports projected EPS growth rates of

5.9% from *Value Line*, 5.3% from I/B/E/S/, and 5.7% from Zacks. He also reports projected DPS and BVPS growth rates of 4.8% and 4.6% from *Value Line.* These projected growth rates suggest a DCF growth rate in the range of 5.5%. His one projected higher figure is his projected sustainable growth rate of 7.4%. However, this growth rate is inflated by a 16.7% growth rate for Chesapeake. Since this figure is clearly an outlier, the average or mean is distorted. In such cases, the median is used as measure of central tendency. The median sustainable growth rate for the group is 5.8%. As such, his DCF growth rate range of 5.5% to 6.5% is not supported by the projected data for the proxy group. A projected DCF growth rate of 5.5%, with a resulting DCF equity cost rate of 8.5%, is more reflective of the data.

2. The Low Weight Give the DCF Results

Q. HOW MUCH WEIGHT HAS DR. FAIRCHILD GIVEN HIS DISTORTED DCF RESULTS?

A. Very little. A review of his equity cost rate results in Exhibit JRW-13 indicates that Dr. Fairchild must have given extremely high weight to his projected CAPM and CE results. However, as discussed below, these two approaches are based on faulty economic assumptions and therefore do not provide a reliable measure of KGS' cost of equity capital.

B. CAPM Approach

Q. PLEASE DISCUSS DR. FAIRCHILD'S CAPM.

A. On pages 24-29 of his testimony and Schedules BHF-5 – BHF-6, Dr. Fairchild estimates an equity cost rate by applying a CAPM model to his proxy group. The CAPM approach requires an estimate of the risk-free interest rate, beta, and the equity risk premium. Dr. Fairchild uses a current 30-Year Treasury bond yield of 2.62%, an average *Value Line* Beta of 0.76, and two market risk premium measures (a historical market risk premium of 7.00% and a projected market risk premium of 8.39. He also adds a size premium of 1.49%. Dr. Fairchild's CAPM results are summarized in Panel B of page 1 of Exhibit JRW-13. Based on these figures, he finds a CAPM equity cost rate range from 9.40% to 10.46%.

Q. WHAT ARE THE ERRORS IN DR. FAIRCHILD'S CAPM ANALYSES?

A. The primary errors in Dr. Fairchild's CAPM analyses are: (1) the historical and projected market risk premiums; and (2) the size adjustment.

1. Historical Market Risk Premium

Q. PLEASE REIVEW DR. FAIRCHILD'S HISTORICAL MARKET RISK PREMIUM.

A. Dr. Fairchild's historical risk premium of 7.0% is computed as the difference between the arithmetic mean stock return minus the long-term government bond return over

the 1926-2015 time period as published by Morningstar.

Q. PLEASE ADDRESS THE ISSUES INVOLVED IN USING HISTORICAL STOCK AND BOND RETURNS TO COMPUTE A FORWARD-LOOKING OR *EX ANTE* RISK PREMIUM.

A. As previously discussed, it is common to compute a market risk premium as the difference between historic stock and bond returns. But, it is well-known and well-studied that using historical returns to measure an *ex ante* equity risk premium is erroneous and overstates the true market or equity risk premium.[36] This approach produces differing results depending on several factors, including the measure of central tendency used, the time period evaluated, and the stock and bond market index employed. In addition, there are a myriad of empirical problems in the approach, which result in historical market returns producing inflated estimates of expected risk premiums. Among the errors are the U.S. stock market survivorship bias (the "Peso Problem"), the company survivorship bias (only successful companies survive – poor companies do not survive), the measurement of central tendency (the arithmetic versus geometric mean), the historical time horizon used, the change in risk and required return over time, the downward bias in bond historical returns, and unattainable return bias (the Ibbotson procedure presumes monthly portfolio

[36] These issues are addressed in a number of studies, including: Aswath. Damodaran, "Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition" NYU Working Paper, 2015, pp. 32-5; See Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics*, pp. 371-86, (1983); Jay Ritter, "The Biggest Mistakes We Teach," *Journal of Financial Research* (Summer 2002); Bradford Cornell, *The Equity Risk Premium* (New York, John Wiley & Sons),1999, pp. 36-78; and J. P. Morgan, "The Most Important Number in Finance," p. 6.

rebalancing).[37] The bottom line is that there are a number of empirical problems in using historical stock and bond returns to measure an expected equity risk premium.

2. Projected Market Risk Premium

Q. PLEASE ASSESS DR. FAIRCHILD'S MARKET RISK PREMIUM DERIVED FROM APPLYING THE DCF MODEL TO THE S&P 500.

A. Dr. Fairchild develops an expected market risk premium by: (1) applying the DCF model to the S&P 500 to get an expected market return; and (2) subtracting the risk-free rate of interest. Dr. Fairchild's estimated market return of 11.01% for the S&P 500 equals the sum of the dividend yield of 2.67% and expected EPS growth rate of 8.34%. The expected EPS growth rate is the average of the expected EPS growth rates from *Value Line*, I/B/E/S, and Zacks. The primary error in this approach is Dr. Fairchild's expected DCF growth rate. As previously discussed, the expected EPS growth rates of Wall Street analysts are upwardly biased. In addition, as explained below, the projected growth rate is inconsistent with economic and earnings growth in the U.S.

[37] These issues are addressed in a number of studies, including: Aswath. Damodaran, "Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2015 Edition" NYU Working Paper, 2015, pp. 32-5; See Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics*, pp. 371-86, (1983); Jay Ritter, "The Biggest Mistakes We Teach," *Journal of Financial Research* (Summer 2002); Bradford Cornell, *The Equity Risk Premium* (New York, John Wiley & Sons),1999, pp. 36-78; and J. P. Morgan, "The Most Important Number in Finance," p. 6.

Q. BEYOND YOUR PREVIOUS DISCUSSION OF THE UPWARD BIAS IN WALL STREET ANALYSTS' EPS GROWTH RATE FORECASTS, IS THERE OTHER EVIDENCE THAT INDICATES THAT DR. FAIRCHILD'S S&P 500 GROWTH RATE IS EXCESSIVE?

A. Yes. A long-term EPS growth rate of 8.34% is not consistent with historic as well as projected economic and earnings growth in the U.S for several reasons: (1) long-term EPS and economic growth, as measured by GDP, is about one-third lower than Dr. Fairchild's projected EPS growth rate of 8.34%; (2) more recent trends in GDP growth, as well as projections of GDP growth, suggest slower economic and earnings growth in the future; and (3) over time, EPS growth tends to lag behind GDP growth.

The long-term economic, earnings, and dividend growth rate in the U.S. has only been in the 5% to 7% range. I performed a study of the growth in nominal GDP, S&P 500 stock price appreciation, and S&P 500 EPS and DPS growth since 1960. The results are provided on page 1 of Exhibit JRW-14, and a summary is given in the Table 4.

Table 4
GDP, S&P 500 Stock Price, EPS, and DPS Growth
1960-Present

Nominal GDP	**6.58%**
S&P 500 Stock Price	**6.69%**
S&P 500 EPS	**6.64%**
S&P 500 DPS	**5.76%**
Average	**6.42%**

The results are presented graphically on page 2 of Exhibit JRW-14. In sum, the historical long-run growth rates for GDP, S&P EPS, and S&P DPS are in the 5% to 7% range. By comparison, Dr. Fairchild's long-run growth rate projection of

8.34% is overstated. These estimates suggest that companies in the U.S. would be expected to: (1) increase their growth rate of EPS by almost 50% in the future and (2) maintain that growth indefinitely in an economy that is expected to grow at about one-half of his projected growth rates.

Q. DO MORE RECENT DATA SUGGEST THAT THE U.S. ECONOMY GROWTH IS FASTER OR SLOWER THAN THE LONG-TERM DATA?

A. The more recent trends suggest lower future economic growth than the long-term historic GDP growth. The historic GDP growth rates for 10-, 20-, 30-, 40- and 50-years, is presented in Panel A of page 3 of Exhibit JRW-14 and in Table 5 below.

Table 5
Historic GDP Growth Rates

10-Year Average - 2006-2015	**3.28%**
20-Year Average - 1996-2015	**4.36%**
30-Year Average - 1986-2015	**4.87%**
40-Year Average - 1976-2015	**6.19%**
50-Year Average - 1966-2015	**6.65%**

These data clearly suggest that nominal GDP growth in recent decades has slowed to the 4.0% to 5.0% area.

Q. ARE THE LOWER GDP GROWTH RATES OF RECENT DECADES CONSISTENT WITH THE FORECASTS OF GDP GROWTH?

A. Yes. A lower range is also consistent with long-term GDP forecasts. There are several forecasts of annual GDP growth that are available from economists and government agencies. These are listed on page 3 of Exhibit JRW-14. Economists, in the February

2016 *Survey of Professional Forecasters,* forecasted the mean 10-year nominal GDP growth rate to be 4.5%.[38] The U.S. Energy Information Administration ("EIA"), in its projections used in preparing *Annual Energy Outlook,* forecasted long-term GDP growth of 4.4% for the period 2013-2040.[39] The Congressional Budget Office ("CBO"), in its forecasts for the period 2015 to 2040, projected a nominal GDP growth rate of 4.1%.[40] Finally, the Social Security Administration ("SSA"), in its Annual OASDI Report, projected a nominal GDP growth rate of 4.4% for the period 2013-2090.[41] These four forecasts and projections of GDP growth from economists and government agencies range from 4.1% to 4.5%.

Q. WHY IS GDP GROWTH RELEVANT IN YOUR CRITIQUE OF DR. FAIRCHILD'S USE OF THE LONG-TERM EPS GROWTH RATES IN DEVELOPING A MARKET RISK PREMIUM FOR HIS CAPM?

A. Because, as indicated in recent research, the long-term earnings growth rates of companies are limited to the growth rate in GDP.

Q. PLEASE HIGHLIGHT THE RESEARCH ON THE LINK BETWEEN ECONOMIC AND EARNINGS GROWTH AND EQUITY RETURNS.

A. In 2010, Brad Cornell of the California Institute of Technology published a study on GDP growth, earnings growth, and equity returns. He finds that long-term EPS

[38] Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters (Feb, 2016).*
[39] U.S. Energy Information Administration, *Annual Energy Outlook.*
http://www.eia.gov/forecasts/aeo/tables_ref.cfm Table 20.
[40] Congressional Budget Office, The *2016 Long-term Budget Outlook*, July 2016.
www.cbo.gov/publication/51129.
[41] Social Security Administration, 2016 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program. http://www.ssa.gov/oact/tr/2016/X1_trLOT.html

growth in the U.S. is directly related to GDP growth, with GDP growth providing an upward limit on EPS growth. In addition, he finds that long-term stock returns are determined by long-term earnings growth. He concludes with the following observations:[42]

> The long-run performance of equity investments is fundamentally linked to growth in earnings. Earnings growth, in turn, depends on growth in real GDP. This article demonstrates that both theoretical research and empirical research in development economics suggest relatively strict limits on future growth. In particular, real GDP growth in excess of 3 percent in the long run is highly unlikely in the developed world. In light of ongoing dilution in earnings per share, this finding implies that investors should anticipate real returns on U.S. common stocks to average no more than about 4–5 percent in real terms.

Given current inflation in the 2% to 3% range, the results imply nominal expected stock market returns in the 7% to 8% range. As such, Dr. Fairchild's projected earnings growth rates and implied expected stock market returns and equity risk premiums are not indicative of the realities of the U.S. economy and stock market. As such, his expected CAPM equity cost rates are significantly overstated.

Q. PLEASE PROVIDE A SUMMARY ASSESSMENT OF DR. FAIRCHILD'S PROJECTED EQUITY RISK PREMIUM DERIVED FROM EXPECTED MARKET RETURNS.

A. Dr. Fairchild's market risk premium derived from his DCF application to the S&P 500 is inflated due to errors and bias in his study. Investment banks, consulting firms, and CFOs use the equity risk premium concept every day in making financing, investment, and valuation decisions. On this issue, the opinions of CFOs and financial

[42] Bradford Cornell, "Economic Growth and Equity Investing," *Financial Analysts Journal* (January- February, 2010), p. 63.

forecasters are especially relevant. CFOs deal with capital markets on an ongoing basis since they must continually assess and evaluate capital costs for their companies. They are well aware of the historical stock and bond return studies of Ibbotson. The CFOs in the June 2016 *CFO Magazine* – Duke University Survey of over almost 450 CFOs shows an expected return on the S&P 500 of 6.30% over the next ten years. In addition, the financial forecasters in the February 2016 Federal Reserve Bank of Philadelphia survey expect an annual market return of 5.34% over the next ten years. With a more realistic equity or market risk premium, the appropriate equity cost rate for a public utility should be in the 8.0% to 9.0% range and not in the 10.0% to 11.0% range.

4. Size Adjustment

Q. PLEASE DISCUSS DR. FAIRCHILD'S SIZE ADJUSTMENT.

A. Dr. Fairchild includes a size adjustment of 1.49% in his CAPM approach for the size of the companies in the utility group. This adjustment is based on the historical stock market returns studies as performed by Morningstar (formerly Ibbotson Associates). There are numerous errors in using historical market returns to compute risk premiums. These errors provide inflated estimates of expected risk premiums. Among the errors are survivorship bias (only successful companies survive – poor companies do not) and unattainable return bias (the Ibbotson procedure presumes monthly portfolio rebalancing). The net result is that Ibbotson's size premiums are poor measures for risk adjustment to account for the size of a utility.

In addition, Professor Annie Wong has tested for a size premium in utilities and concluded that, unlike industrial stocks, utility stocks do not exhibit a significant size premium.[43] As explained by Professor Wong, there are several reasons why such a size premium would not be attributable to utilities. Utilities are regulated closely by state and federal agencies and commissions, and hence, their financial performance is monitored on an ongoing basis by both the state and federal governments. In addition, public utilities must gain approval from government entities for common financial transactions such as the sale of securities. Furthermore, unlike their industrial counterparts, accounting standards and reporting are fairly standardized for public utilities. Finally, a utility's earnings are predetermined to a certain degree through the ratemaking process in which performance is reviewed by state commissions and other interested parties. Overall, in terms of regulation, government oversight, performance review, accounting standards, and information disclosure, utilities are much different than industrials, which could account for the lack of a size premium.

Q. PLEASE DISCUSS THE RESEARCH ON THE SIZE PREMIUM IN ESTIMATING THE EQUITY COST RATE.

A. As noted, there are errors in using historical market returns to compute risk premiums. With respect to the small firm premium, Richard Roll (1983) found that one-half of the historic return premium for small companies disappears once biases are eliminated and historic returns are properly computed. The error arises from the

[43] Annie Wong, "Utility Stocks and the Size Effect: An Empirical Analysis," *Journal of the Midwest Finance Association*, pp. 95-101, (1993).

assumption of monthly portfolio rebalancing and the serial correlation in historic small firm returns.[44]

In a more recent paper, Ching-Chih Lu (2009) estimated the size premium over the long-run. Lu acknowledges that many studies have demonstrated that smaller companies have historically earned higher stock market returns. However, Lu highlights that these studies rebalance the size portfolios on an annual basis. This means that at the end of each year the stocks are sorted based on size, split into deciles, and the returns are computed over the next year for each stock decile. This annual rebalancing creates the problem. Using a size premium in estimating a CAPM equity cost rate requires that a firm carry the extra size premium in its discount factor for an extended period of time, not just for one year, which is the presumption with annual rebalancing. Through an analysis of small firm stock returns for longer time periods (and without annual rebalancing), Lu finds that the size premium disappears within two years. Lu's conclusion with respect to the size premium is that "a small firm should not be expected to have a higher size premium going forward sheerly because it is small now":[45]

> However, an analysis of the evolution of the size premium will show that it is inappropriate to attach a fixed amount of premium to the cost of equity of a firm simply because of its current market capitalization. For a small stock portfolio which does not rebalance since the day it was constructed, its annual return and the size premium are all declining over years instead of staying at a relatively stable level. This confirms that a small firm should not be expected to have a higher size premium going forward sheerly because it is small now.

[44] *See* Richard Roll, "On Computing Mean Returns and the Small Firm Premium," *Journal of Financial Economics*, pp. 371-86, (1983).
[45] Ching-Chih Lu, "The Size Premium in the Long Run," 2009 Working Paper, SSRN abstract no. 1368705.

C. Risk Premium ("RP") Approach

Q. PLEASE DISCUSS DR. FAIRCHILD'S RP APPROACH.

A. On pages 29-32 of his testimony and in Schedule BHF-7, Dr. Fairchild develops an equity cost rate by applying the RP model to his gas group. Dr. Fairchild estimates equity cost rates of 9.49% and 9.69% for his gas group. Dr. Fairchild develops an equity cost rate by: (1) regressing the annual authorized returns on equity for gas distribution companies from the 1980 to 2015 time period Moody's long-term public utility bond yields; and (2) adding the appropriate risk premiums established in (1) to current a Moody's long-term public utility bond yield of 4.11%.

Q. WHAT ARE THE ISSUES WITH DR. FAIRCHILD'S URP APPROACH?

A. The issues include the base yield as well as the measurement and magnitude of the risk premium.

1. Base Interest Rate

Q. PLEASE DISCUSS THE BASE YIELD OF DR. FAIRCHILD'S URP ANALYSIS.

A. The base yield in Dr. Fairchild's RP analyses is the prospective yield on long-term, 'Baa' rated public utility bonds. This is erroneous because using the yield on these securities inflates the required return on equity for the Company in two ways: (1) long-term bonds are subject to interest rate risk, a risk which does not affect common stockholders since dividend payments (unlike bond interest payments) are not fixed but

tend to increase over time; and (2) the base yield in Dr. Fairchild's risk premium study is subject to credit risk since it is not default risk-free like an obligation of the U.S. Treasury. As a result, its yield-to-maturity includes a premium for default risk and therefore, is above its expected return. Hence, using a bond's yield-to-maturity as a base yield results in an overstatement of investors' return expectations.

2. Risk Premium

Q. WHAT ARE THE ISSUES WITH DR. FAIRCHILD'S RISK PREMIUM?

A. The most important issue is that Dr. Fairchild's risk premium is not necessarily applicable to measure utility investors' required rate of return. Dr. Fairchild's RP approach is a gauge of *commission* behavior, not *investor* behavior. Capital costs are determined in the market place through the financial decisions of investors and are reflected in such fundamental factors as dividend yields, expected growth rates, interest rates, and investors' assessment of the risk and expected return of different investments. Regulatory commissions evaluate capital market data in setting authorized ROEs, but also take into account other utility- and rate case-specific information in setting ROEs. As such, Dr. Fairchild's approach and results reflects other factors such as capital structure, credit ratings and other risk measures, service territory, capital expenditures, energy supply issues, rate design, investment and expense trackers, and other factors used by utility commissions in determining an appropriate ROE in addition to capital costs. This may be especially true when, due to the inherent compromises and trade-offs upon which settlements are made, the

authorized ROE data includes the results of rate cases that are settled and not fully litigated.

Finally, Dr. Fairchild's methodology produces an inflated required rate of return since utilities have been selling at a market-to-book ratios in excess of 1.0 for many years. This indicates that the authorized rates of return have been greater than the return that investors require. The relationship between ROE, the equity cost rate, and market-to-book ratios was explained earlier in this testimony. In short, a market-to-book ratio above 1.0 indicates a company's ROE is above its equity cost rate. Therefore, the risk premium produced from the study is overstated as a measure of investor return requirements and produced an inflated equity cost rate.

D. Comparable Earnings ("CE") Approach

Q. PLEASE DISCUSS DR. FAIRCHILD'S EXPECTED EARNINGS ANALYSIS.

A. At pages 32-33 of his testimony and in Schedule BHF-8, Dr. Fairchild estimates an equity cost rate ranging from 10.5% to 11.2% for his gas group using the CE approach. His methodology simply involves using the projected ROE for the companies in the proxy group for the years 2016-2019-21 as estimated by *Value Line*. This approach is fundamentally flawed for several reasons. First, these ROE results include the profits associated with the unregulated operations of the utility proxy group. As shown in Exhibit JRW-4, the gas group only receives 63% of revenues from regulated operations. More importantly, since Dr. Fairchild has not evaluated the market-to-book ratios for these companies, they cannot indicate whether the past

and projected returns on common equity are above or below investors' requirements. As shown in Exhibit JRW-4, the average market-to-book ratio for the gas group is 2.2X. This is a clear evidence that these projected returns on common equity are above the returns that investors' require.

Q DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

VERIFICATION

COMMONWEALTH OF PENNSYLVANIA)

COUNTY OF CENTRE) ss:

Dr. J. Randall Woolridge, being duly sworn upon his oath, deposes and states that he is a consultant for the Citizens' Utility Ratepayer Board, that he has read the above and foregoing document, and, upon information and belief, states that the matters therein appearing are true and correct.

Dr. J. Randall Woolridge

SUBSCRIBED AND SWORN to before me this 6 day of September, 2016.

Mary L. Hart
Notary Public

My Commission expires: Aug 26, 2017

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
MARY L HART
Notary Public
STATE COLLEGE BORO., CENTRE COUNTY
My Commission Expires Aug 26, 2017

APPENDIX A

Qualifications of Dr. J. Randall Woolridge

Appendix A
Educational Background, Research, and Related Business Experience
J. Randall Woolridge

J. Randall Woolridge is a Professor of Finance and the Goldman, Sachs & Co. and Frank P. Smeal Endowed Faculty Fellow in Business Administration in the College of Business Administration of the Pennsylvania State University in University Park, PA. In addition, Professor Woolridge is Director of the Smeal College Trading Room and President and CEO of the Nittany Lion Fund, LLC.

Professor Woolridge received a Bachelor of Arts degree in Economics from the University of North Carolina, a Master of Business Administration degree from the Pennsylvania State University, and a Doctor of Philosophy degree in Business Administration (major area-finance, minor area-statistics) from the University of Iowa. He has taught Finance courses including corporation finance, commercial and investment banking, and investments at the undergraduate, graduate, and executive MBA levels.

Professor Woolridge's research has centered on empirical issues in corporation finance and financial markets. He has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance,* the *Journal of Financial Economics,* and the *Harvard Business Review.* His research has been cited extensively in the business press. His work has been featured in the *New York Times*, *Forbes, Fortune, The Economist*, *Barron's*, *Wall Street Journal*, *Business Week*, *Investors' Business Daily*, *USA Today*, and other publications. In addition, Dr. Woolridge has appeared as a guest to discuss the implications of his research on CNN's *Money Line*, CNBC's *Morning Call* and *Business Today*, and Bloomberg's *Morning Call.*

Professor Woolridge's stock valuation book, *The StreetSmart Guide to Valuing a Stock* (McGraw-Hill, 2003), was released in its second edition. He has also co-authored *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation, 1999) as well as a textbook entitled *Basic Principles of Finance* (Kendall Hunt, 2011).

Professor Woolridge has also consulted with corporations, financial institutions, and government agencies. In addition, he has directed and participated in university- and company-sponsored professional development programs for executives in 25 countries in North and South America, Europe, Asia, and Africa.

Over the past twenty-five years Dr. Woolridge has prepared testimony and/or provided consultation services in regulatory rate cases in the rate of return area in following states: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Indiana, Kansas, Kentucky, Maryland, Massachusetts, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Washington, D.C. He has also testified before the Federal Energy Regulatory Commission.

J. Randall Woolridge

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120 Haymaker Circle
State College, PA 16801
814-238-9428

Academic Experience

Professor of Finance, the Smeal College of Business Administration, the Pennsylvania State University (July 1, 1990 to the present).

President, Nittany Lion Fund LLC, (January 1, 2005 to the present)
Director, the Smeal College Trading Room (January 1, 2001 to the present)
Goldman, Sachs & Co. and Frank P. Smeal Endowed University Fellow in Business Administration (July 1, 1987 to the present).

Associate Professor of Finance, College of Business Administration, the Pennsylvania State University (July 1, 1984 to June 30, 1990).

Assistant Professor of Finance, College of Business Administration, the Pennsylvania State University (September, 1979 to June 30, 1984).

Education

Doctor of Philosophy in Business Administration, the University of Iowa (December, 1979). Major field: Finance.

Master of Business Administration, the Pennsylvania State University (December, 1975).

Bachelor of Arts, the University of North Carolina (May, 1973) Major field: Economics.

Books

James A. Miles and J. Randall Woolridge, *Spinoffs and Equity Carve-Outs: Achieving Faster Growth and Better Performance* (Financial Executives Research Foundation), 1999

Patrick Cusatis, Gary Gray, and J. Randall Woolridge, *The StreetSmart Guide to Valuing a Stock* (2nd Edition, McGraw-Hill), 2003.

J. Randall Woolridge and Gary Gray, *The New Corporate Finance, Capital Markets, and Valuation: An Introductory Text* (Kendall Hunt, 2003).

Research

Dr. Woolridge has published over 35 articles in the best academic and professional journals in the field, including the *Journal of Finance,* the *Journal of Financial Economics,* and the *Harvard Business Review.*

EXHIBITS

JRW-1 THRU JRW-14

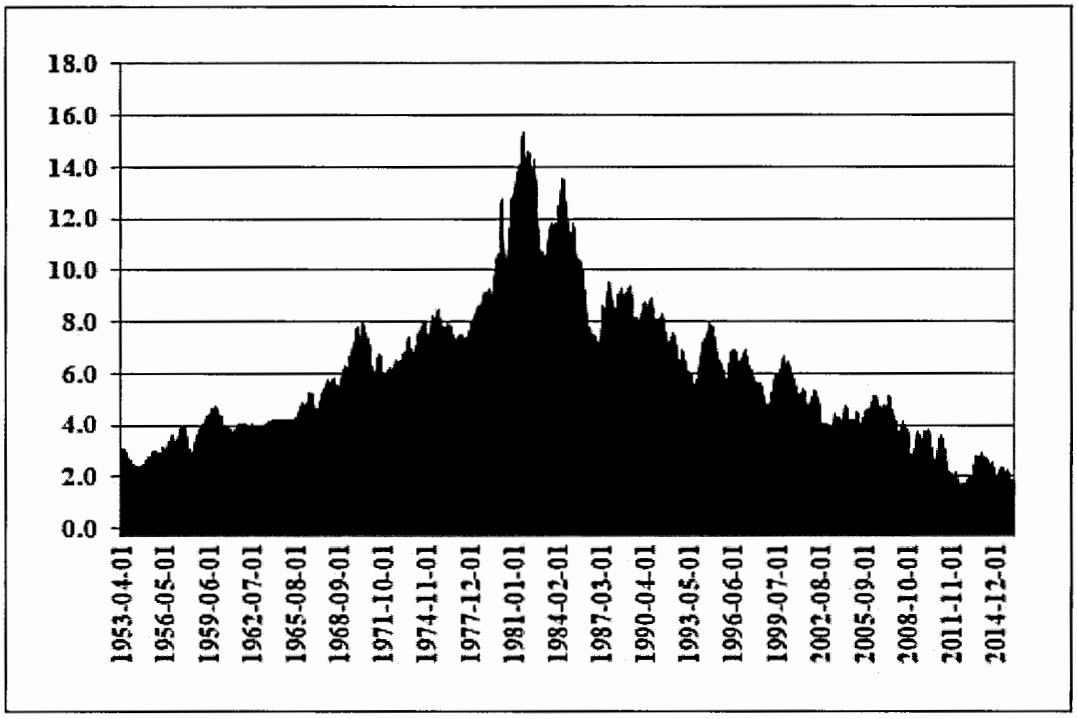
Exhibit JRW-1

Kansas Gas Service
Recommended Cost of Capital

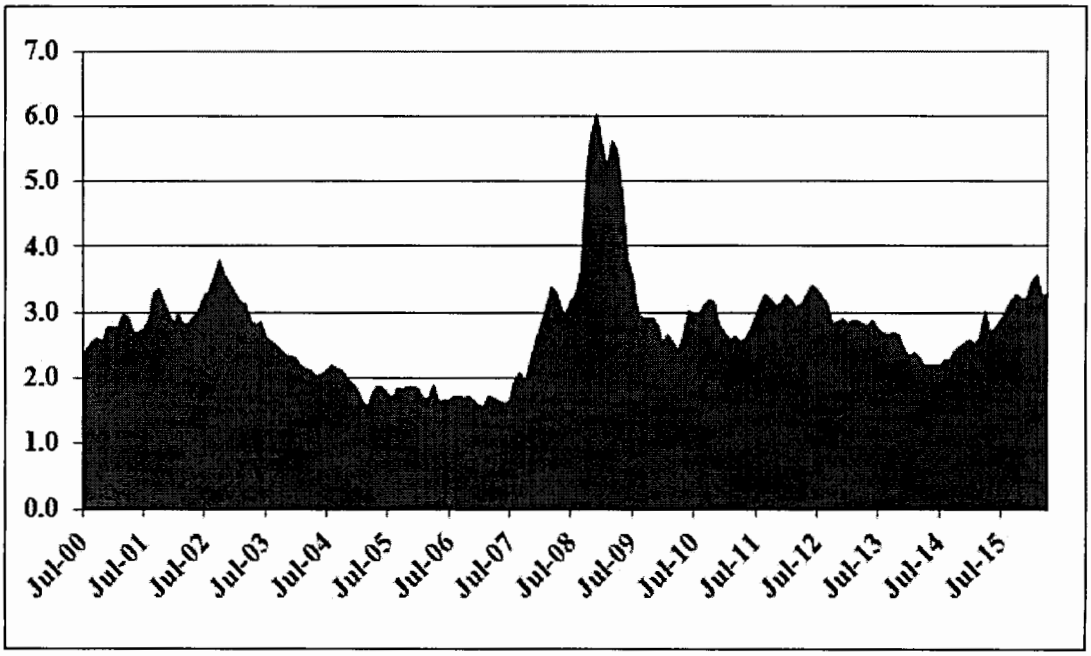
Capital Source	Capitalization Ratio	Cost Rate	Weighted Cost Rate
Long-Term Debt	50.00%	3.95%	1.98%
Common Equity	50.00%	8.50%	4.25%
Total	100.00%		6.23%

Exhibit JRW-2

Panel A
Ten-Year Treasury Yields
1953-Present

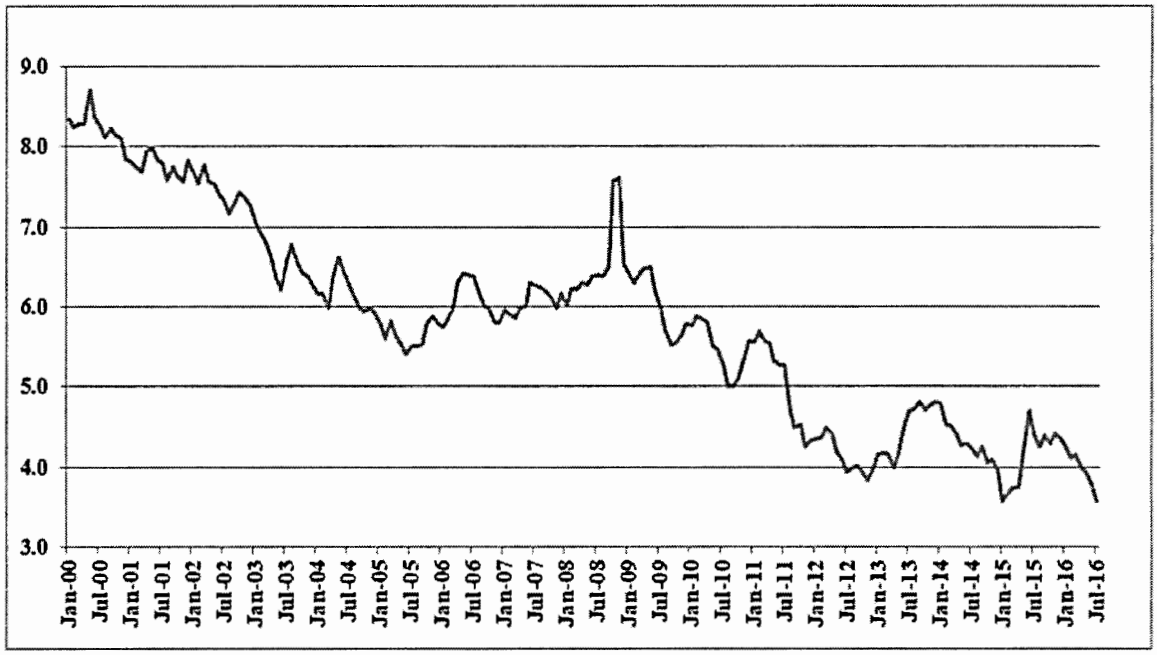


Panel B
Long-Term Moody's Baa Yields Minus Ten-Year Treasury Yields
2000-Present

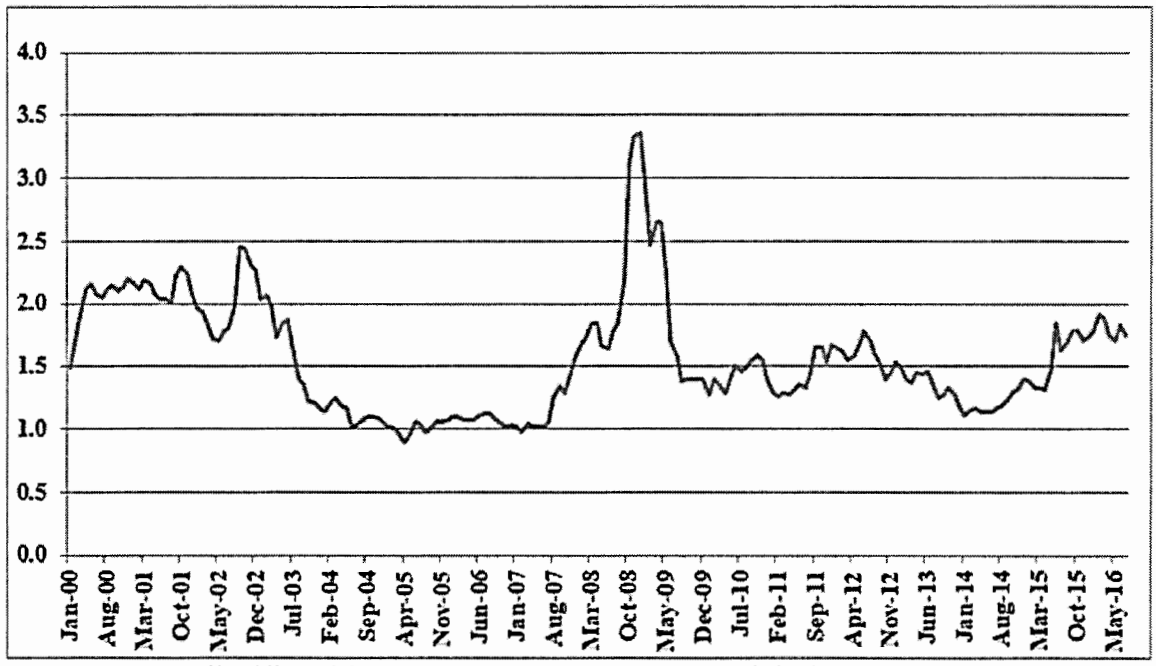


Source: Federal Reserve Bank of St. Louis, FRED Database.

Exhibit JRW-3
Panel A
Long-Term, A-Rated Public Utility Yields



Panel B
Long-Term, A-Rated Public Utility Yields minus -Twenty-Year Treasury Yields



Source: Mergent Bond Record, Federal Reserve Bank of St. Louis, FRED Database.

Exhibit JRW-4

Kansas Gas Service
Summary Financial Statistics for Proxy Groups

Gas Proxy Group

Company	Operating Revenue ($mil)	Percent Gas Revenue	Net Plant ($mil)	Market Cap ($mil)	S&P Issuer Credit Rating	Moody's Long Term Rating	Pre-Tax Interest Coverage	Primary Service Area	Common Equity Ratio	Return on Equity	Market to Book Ratio
Atmos Energy Corporation (NYSE-ATO)	3,381.8	71	7,839.4	7.77	A-	A2	5.4	LA,KY,TX,MS,CO,KS,KY	52.0	10.0	2.32
Chesapeake Utilities Corporation (NYSE-CPK)	435.5	54	881.2	0.90	NR	NR	7.7	DE,MD,FL	53.1	11.7	2.44
New Jersey Resources Corp. (NYSE-NJR)	1,915.2	31	2,242.7	3.16	A-	A1	7.5	NJ	54.5	10.1	2.61
Northwest Natural Gas Co. (NYSE-NWN)	717.7	97	2,196.7	1.65	A	Aa2	3.5	OR,WA	51.5	7.8	2.04
South Jersey Industries, Inc. (NYSE-SJI)	909.7	50	2,478.2	2.15	A+	A3	6.4	NJ	43.6	11.6	1.96
Southwest Gas Corporation (NYSE-SWX)	2,460.7	58	3,929.0	3.53	BBB+	A2	4.1	AZ,NV,CA	53.5	8.8	2.13
Spire, Inc. (NYSE-SR)	1,756.2	97	2,953.3	1.68	BBB+	A3	4.2	MO,AL	41.8	8.7	1.81
WGL Holdings, Inc. (NYSE-WGL)	2,357.9	45	3,832.5	31.58	A+	A3	5.7	DC,MD,VA	53.3	11.9	2.60
Mean	1,741.8	63	3,294.1	6.6	A-	A3	5.6		50.4	10.1	2.24
Median	1,835.7	56	2,715.8	2.7	A-	A3	5.6		52.6	10.1	2.23

Data Source: *AUS Utility Reports*, July, 2016; Pre-Tax Interest Coverage and Primary Service Territory are from *Value Line Investment Survey*, 2016

Exhibit JRW-4

Kansas Gas Service
Value Line Risk Metrics

Gas Proxy Group

Company	Beta	Financial Strength	Safety	Earnings Predictability	Stock Price Stability
Atmos Energy Corporation (NYSE-ATO)	0.75	A	1	90	95
Chesapeake Utilities Corporation (NYSE-CPK)	0.60	B++	2	95	85
New Jersey Resources Corp. (NYSE-NJR)	0.80	A+	1	60	85
Northwest Natural Gas Co. (NYSE-NWN)	0.65	A	1	90	95
South Jersey Industries, Inc. (NYSE-SJI)	0.80	A	2	80	90
Southwest Gas Corporation (NYSE-SWX)	0.75	B++	3	80	90
Spire, Inc. (NYSE-SR)	0.70	B++	2	85	100
WGL Holdings, Inc. (NYSE-WGL)	0.75	A	1	75	90
Mean	0.73	A	1.6	82	91

Data Source: *Value Line Investment Survey*, 2016.

Value Line Risk Metrics

Beta

A relative measure of the historical sensitivity of a stock's price to overall fluctuations in the New York Stock Exchange Composite Index. A of 1.50 indicates a stock tends to rise (or fall) 50% more than the New York Stock Exchange Composite Index. The ''coefficient'' is derived from a regression analysis of the relationship between weekly percent-age changes in the price of a stock and weekly percentage changes in the NYSE Index over a period of five years. In the case of shorter price histories, a smaller time period is used, but two years is the minimum. Betas are adjusted for their long-term tendency to converge toward 1.00.

Financial Strength

A relative measure of of the companies reviewed by Value Line. The relative ratings range from A++ (strongest) down to C (weakest).

Safety Rank

A measurement of potential risk associated with individual common stocks. The Safety Rank is computed by averaging two other Value Line indexes the Price Stability Index and the Financial strength Rating. Safety Ranks range from 1 (Highest) to 5 (Lowest). Conservative investors should try to limit their purchases to equities ranked 1 (Highest) and 2 (Above Average) for Safety.

Earnings Predictability

A measure of the reliability of an earnings forecast. Earnings Predictability is based upon the stability of year-to-year comparisons, with recent years being weighted more heavily that earlier ones. The most reliable forecasts tend to be those with the highest rating (100); the least reliable, the lowest (5). The earnings stability is derived from the standard deviation of percentage changes in quarterly earnbings over an eight-year period. Special adjustments are made for comparisons around zero and from plus to minus.

Stock Price Stability

A measure of the stability of a stock's price It includes sensitivity to the market (see Beta as well as the stock's inherent volatility. Value Line Stability ratings range from 1 (highest) to 5 (lowest).

Source: *Value Line Investment Analyzer*.

Capital Structure and Debt Cost Rate

Panel A - KGS Recommended Capital Structure and Debt Cost Rate

Capital Source	Capitalization Ratio	Cost Rate
Long-Term Debt	45.00%	3.95%
Common Equity	55.00%	
Total	100.00%	

Panel B - Proxy Group Average Quarterly Capitalization Ratios

Capital Source	Capitalization Ratio
Short-Term Debt	11.24%
Long-Term Debt	38.67%
Preferred Stock	0.13%
Common Equity	48.79%
Total	100.00%

Panel C - CURB Recommended Capital Structure and Debt Cost Rate

Capital Source	Capitalization Ratio	Cost Rate
Long-Term Debt	50.00%	3.95%
Common Equity	50.00%	
Total	100.00%	

Kansas Gas Services
Capital Structure Ratios
Gas Proxy Group

ATO	3/31/2016	12/31/2015	9/30/2015	6/30/2015
Short Term Debt	626,929	763,236	457,927	251,977
Long-Term Debt	2,455,559	2,455,474	2,455,388	2,455,303
Preferred Stock	0	0	0	0
Common Equity	3,344,565	3,272,109	3,194,797	3,238,255
Total	6,427,053	6,490,819	6,108,112	5,945,535

ATO	3/31/2016	12/31/2015	9/30/2015	6/30/2015	Average
Short Term Debt	9.8%	11.8%	7.5%	4.2%	8.3%
Long-Term Debt	38.2%	37.8%	40.2%	41.3%	39.4%
Preferred Stock	0.0%	0.0%	0.0%	0.0%	0.0%
Common Equity	52.0%	50.4%	52.3%	54.5%	52.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

0

CPK	3/31/2016	12/31/2015	9/30/2015	6/30/2015
Short Term Debt	181,905	182,548	136,232	103,840
Long-Term Debt	148,602	149,340	155,909	156,247
Preferred Stock	0	0	0	0
Common Equity	374,252	358,138	353,315	351,176
Total	704,759	690,026	645,456	611,263

CPK	3/31/2016	12/31/2015	9/30/2015	6/30/2015	Average
Short Term Debt	25.8%	26.5%	21.1%	17.0%	22.6%
Long-Term Debt	21.1%	21.6%	24.2%	25.6%	23.1%
Preferred Stock	0.0%	0.0%	0.0%	0.0%	0.0%
Common Equity	53.1%	51.9%	54.7%	57.5%	54.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

NJR	3/31/2016	12/31/2015	9/30/2015	6/30/2015
Short Term Debt	217,918	273,837	110,279	89,021
Long-Term Debt	844,391	848,206	843,595	847,521
Preferred Stock	0	0	0	0
Common Equity	1,207,482	1,143,944	1,106,956	1,123,312
Total	2,269,791	2,265,987	2,060,830	2,059,854

NJR	3/31/2016	12/31/2015	9/30/2015	6/30/2015	Average
Short Term Debt	9.6%	12.1%	5.4%	4.3%	7.8%
Long-Term Debt	37.2%	37.4%	40.9%	41.1%	39.2%
Preferred Stock	0.0%	0.0%	0.0%	0.0%	0.0%
Common Equity	53.2%	50.5%	53.7%	54.5%	53.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

NWN	6/30/2016	3/31/2016	12/31/2015	9/30/2015
Short Term Debt	181,258	207,193	317,127	247,149
Long-Term Debt	570,045	569,745	576,700	621,700
Preferred Stock	0	0	0	0
Common Equity	799,999	806,955	780,972	759,209
Total	1,551,302	1,583,893	1,674,799	1,628,058

NWN	6/30/2016	3/31/2016	12/31/2015	9/30/2015	Average
Short Term Debt	11.7%	13.1%	18.9%	15.2%	14.7%
Long-Term Debt	36.7%	36.0%	34.4%	38.2%	36.3%
Preferred Stock	0.0%	0.0%	0.0%	0.0%	0.0%
Common Equity	51.6%	50.9%	46.6%	46.6%	48.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

SR	3/31/2016	12/31/2015	9/30/2015	6/30/2015
Short Term Debt	253,600	377,100	418,000	291,400
Long-Term Debt	1,851,600	1,851,500	1,771,500	1,736,400
Preferred Stock	0	0	0	0
Common Equity	1,681,400	1,600,300	1,573,600	1,608,600
Total	3,786,600	3,828,900	3,763,100	3,636,400

SR	3/31/2016	12/31/2015	9/30/2015	6/30/2015	Average
Short Term Debt	6.7%	9.8%	11.1%	8.0%	8.9%
Long-Term Debt	48.9%	48.4%	47.1%	47.8%	48.0%
Preferred Stock	0.0%	0.0%	0.0%	0.0%	0.0%
Common Equity	44.4%	41.8%	41.8%	44.2%	43.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

SJI	434,474	551,862	516,102	544,823
Short Term Debt	1,046,968	1,006,394	937,391	859,491
Long-Term Debt	0	0	0	0
Preferred Stock	1,093,442	1,037,539	946,828	969,977
Common Equity	2,574,884	2,595,795	2,400,321	2,374,291
Total				

SJI	3/31/2016	12/31/2015	9/30/2015	6/30/2015	Average
Short Term Debt	16.9%	21.3%	21.5%	22.9%	Average
Long-Term Debt	40.7%	38.8%	39.1%	36.2%	38.7%
Preferred Stock	0.0%	0.0%	0.0%	0.0%	0.0%
Common Equity	42.5%	40.0%	39.4%	40.9%	40.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

SWX	3/31/2016	12/31/2015	9/30/2015	6/30/2015
Short Term Debt	48,596	37,475	19,865	20,050
Long-Term Debt	1,388,968	1,551,204	1,540,364	1,521,683
Preferred Stock	0	0	0	0
Common Equity	1,652,282	1,594,408	1,550,109	1,551,832
Total	3,089,846	3,183,087	3,110,338	3,093,565

SWX	3/31/2016	12/31/2015	9/30/2015	6/30/2015	Average
Short Term Debt	1.6%	1.2%	0.6%	0.6%	1.0%
Long-Term Debt	45.0%	48.7%	49.5%	49.2%	48.1%
Preferred Stock	0.0%	0.0%	0.0%	0.0%	0.0%
Common Equity	53.5%	50.1%	49.8%	50.2%	50.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

WGL	3/31/2016	12/31/2015	9/30/2015	6/30/2015
Short Term Debt	403,469	619,992	420,504	259,836
Long-Term Debt	1,194,251	945,582	944,201	950,494
Preferred Stock	28,200	28,200	28,200	28,200
Common Equity	1,395,087	1,289,075	1,243,220	1,266,346
Total	3,021,007	2,882,849	2,636,125	2,504,876

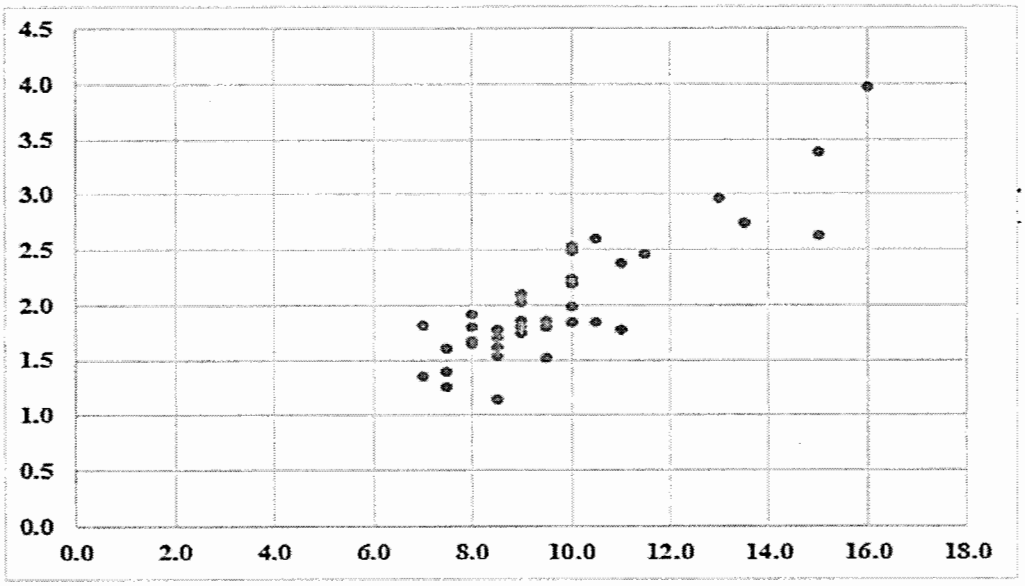
WGL	3/31/2016	12/31/2015	9/30/2015	6/30/2015	Average
Short Term Debt	13.4%	21.5%	16.0%	10.4%	15.3%
Long-Term Debt	39.5%	32.8%	35.8%	37.9%	36.5%
Preferred Stock	0.9%	1.0%	1.1%	1.1%	1.0%
Common Equity	46.2%	44.7%	47.2%	50.6%	47.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Average					
Short Term Debt	11.9%	14.6%	12.8%	10.3%	11.2%
Long-Term Debt	38.4%	37.7%	38.9%	39.7%	38.7%
Preferred Stock	0.1%	0.1%	0.1%	0.1%	0.1%
Common Equity	49.6%	47.5%	48.2%	49.9%	48.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

https://finance.yahoo.com/

Exhibit JRW-6
Electric Utilities
Panel A

Market-to-Book

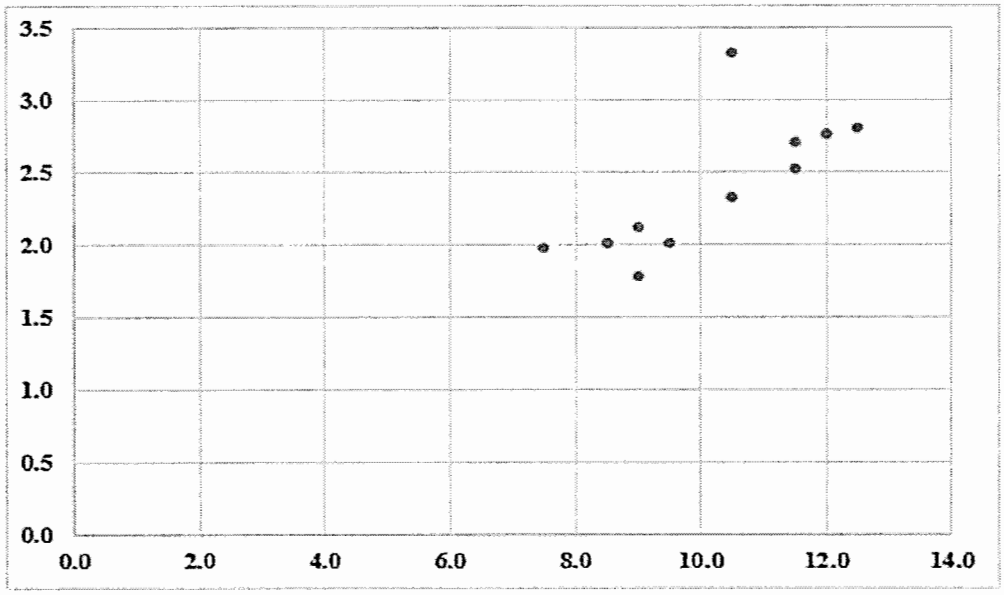


Expected Return on Equity
R-Square = .77, N=42

Source: *Value Line Investment Survey*, 2016.

Panel B
Gas Companies

Market-to-Book

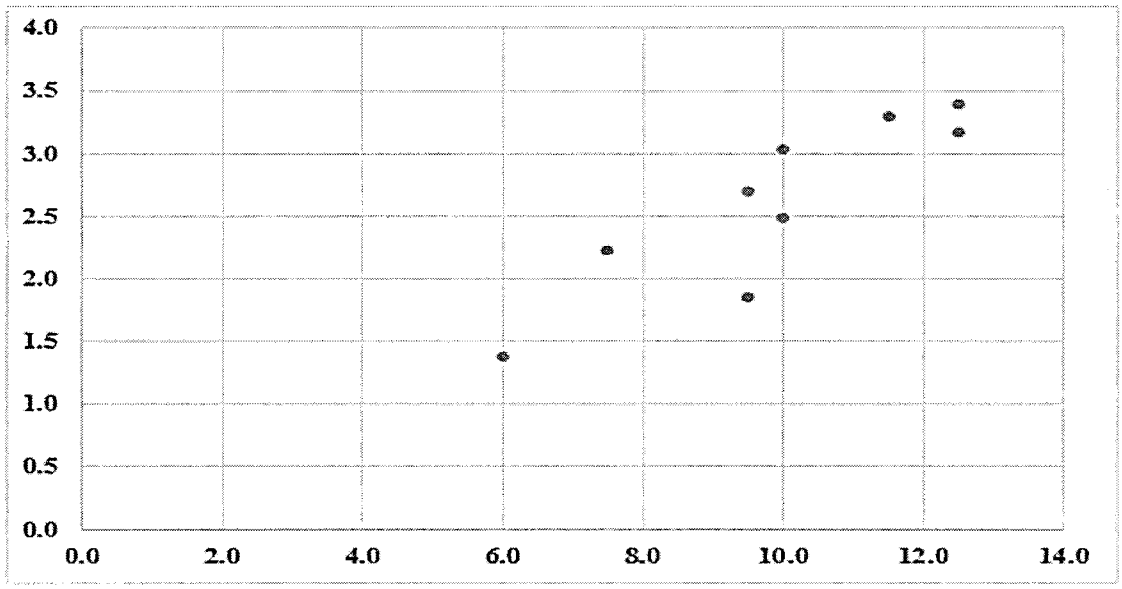


Expected Return on Equity
R-Square = .56, N=12

Source: *Value Line Investment Survey*, 2016.

Exhibit JRW-6
Water Companies
Panel C

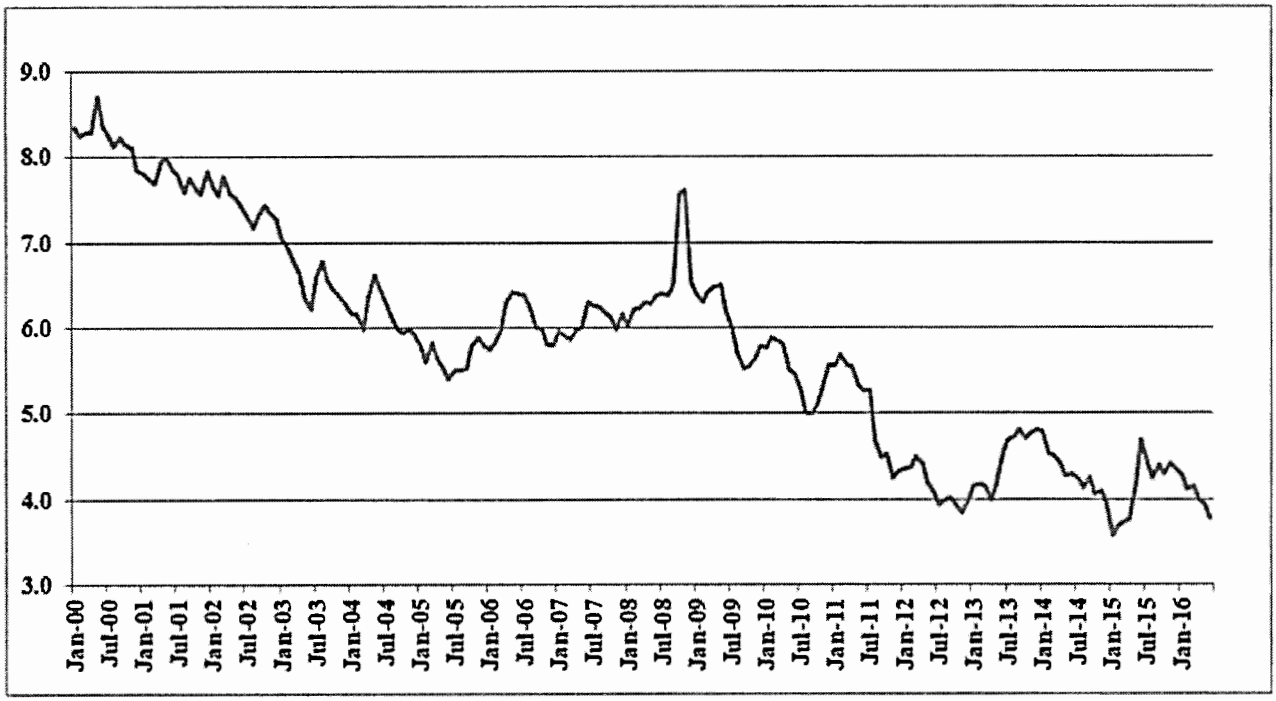
Market-to-Book



Expected Return on Equity
R-Square = .75, N=9

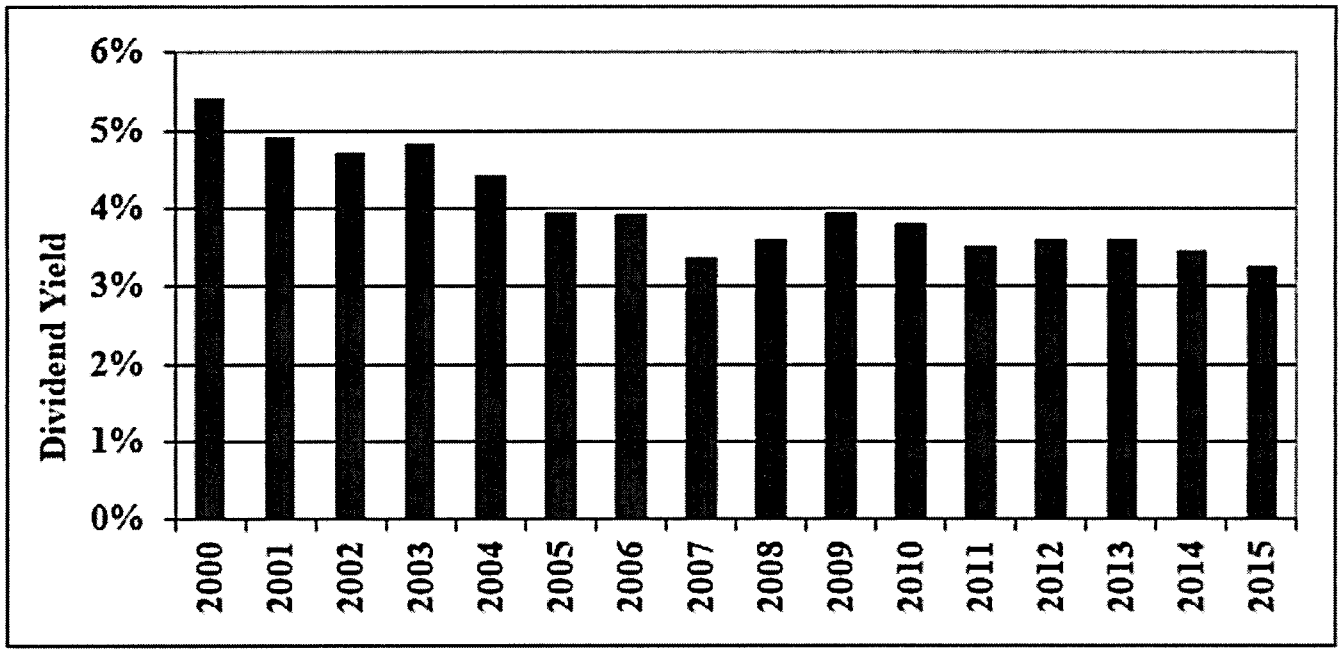
Source: *Value Line Investment Survey*, 2016.

Exhibit JRW-7
Long-Term 'A' Rated Public Utility Bonds



Data Source: Mergent Bond Record

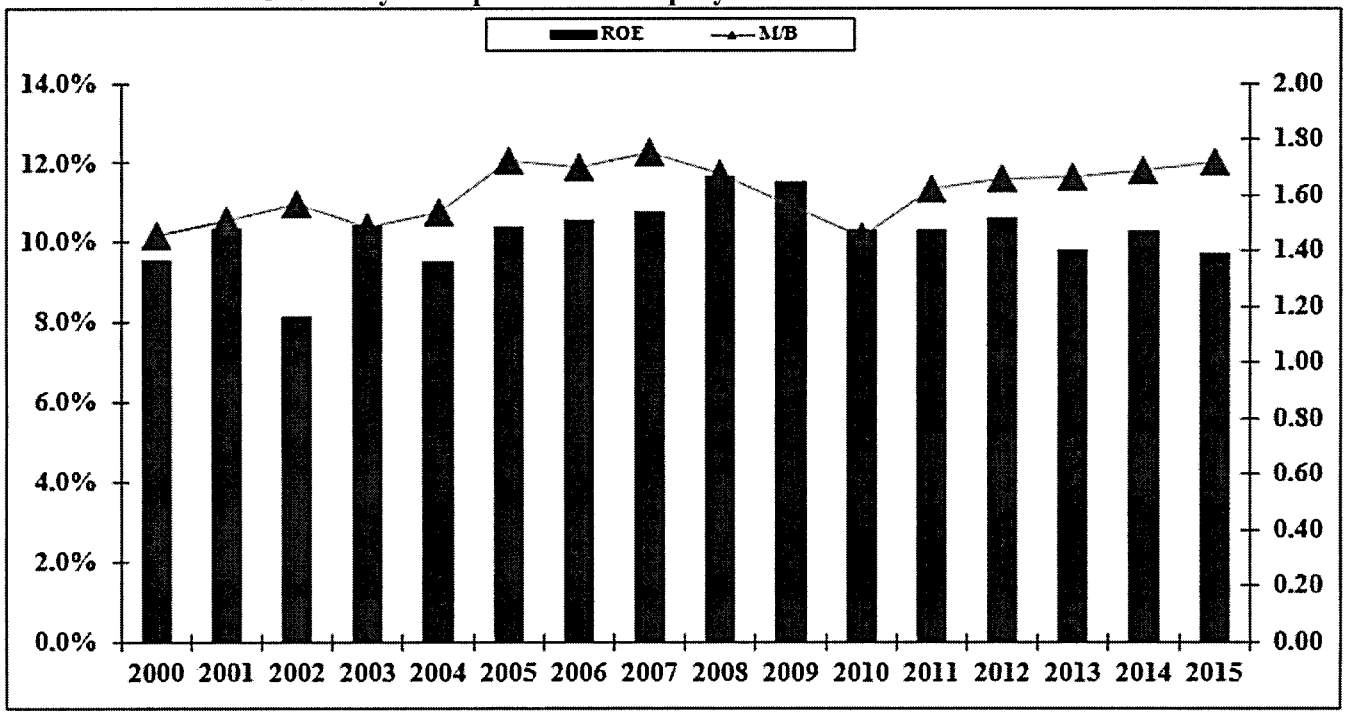
Exhibit JRW-7
Gas Proxy Group Dividend Yields



Data Source: *Value Line Investment Survey.*

Exhibit JRW-7

Gas Proxy Group Return on Equity and Market-to-Book Ratios



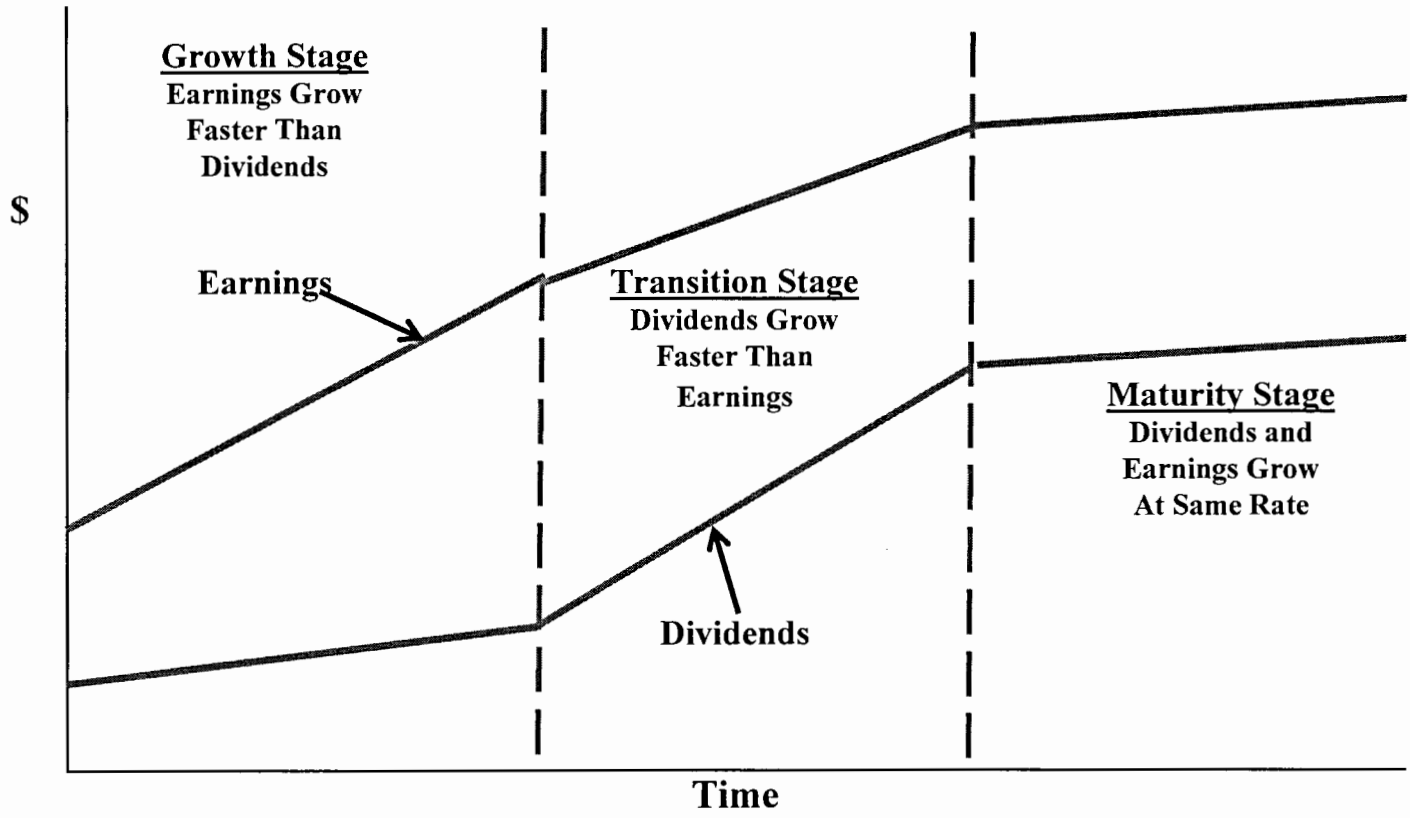
Data Source: *Value Line Investment Survey.*

Exhibit JRW-8

Industry Average Betas

Industry Name	Beta	Industry Name	Beta	Industry Name	Beta
Petroleum (Producing)	1.62	Office Equip/Supplies	1.17	Foreign Electronics	1.01
Maritime	1.54	Furn/Home Furnishings	1.16	Retail (Softlines)	1.00
Homebuilding	1.48	Precision Instrument	1.16	Cable TV	0.99
Oilfield Svcs/Equip.	1.47	Entertainment	1.16	Information Services	0.99
Metals & Mining (Div.)	1.44	Advertising	1.16	Drug	0.99
Steel	1.43	Biotechnology	1.15	Healthcare Information	0.98
Natural Gas (Div.)	1.41	Trucking	1.15	Investment Co.(Foreign)	0.98
Metal Fabricating	1.36	Diversified Co.	1.14	Med Supp Non-Invasive	0.98
Auto Parts	1.35	Financial Svcs. (Div.)	1.14	Telecom. Utility	0.97
Heavy Truck & Equip	1.35	Computer Software	1.14	Precious Metals	0.97
Building Materials	1.34	Internet	1.14	R.E.I.T.	0.96
Engineering & Const	1.30	Newspaper	1.13	Med Supp Invasive	0.96
Hotel/Gaming	1.30	Apparel	1.13	Funeral Services	0.94
Railroad	1.30	Retail (Hardlines)	1.12	Environmental	0.94
Petroleum (Integrated)	1.29	Computers/Peripherals	1.12	Retail Store	0.93
Chemical (Diversified)	1.27	Educational Services	1.11	Restaurant	0.90
Insurance (Life)	1.26	Paper/Forest Products	1.10	Pharmacy Services	0.89
Electrical Equipment	1.26	Wireless Networking	1.10	Thrift	0.89
Public/Private Equity	1.26	Air Transport	1.09	Reinsurance	0.88
Power	1.25	Bank	1.09	Beverage	0.88
Chemical (Specialty)	1.25	Bank (Midwest)	1.08	Food Processing	0.86
Semiconductor	1.24	Recreation	1.07	Insurance (Prop/Cas.)	0.85
Oil/Gas Distribution	1.24	Medical Services	1.06	Investment Co.	0.85
Chemical (Basic)	1.22	Industrial Services	1.06	Household Products	0.84
E-Commerce	1.22	Retail Building Supply	1.06	Retail/Wholesale Food	0.80
Electronics	1.21	Pipeline MLPs	1.05	Tobacco	0.75
Human Resources	1.20	Packaging & Container	1.04	Electric Util. (Central)	0.75
Automotive	1.19	Toiletries/Cosmetics	1.04	Electric Utility (West)	0.74
Machinery	1.19	Shoe	1.02	Natural Gas Utility	0.74
Entertainment Tech	1.18	Retail Automotive	1.02	Water Utility	0.71
Semiconductor Equip	1.18	Telecom. Services	1.01	Electric Utility (East)	0.68
Telecom. Equipment	1.17	IT Services	1.01		
Publishing	1.171	Aerospace/Defense	1.01		

Exhibit JRW-9
DCF Model



Source: William F. Sharpe, Gordon J. Alexander, and Jeffrey V. Bailey, Investments (Prentice-Hall, 1995), pp. 590-91.

Exhibit JRW-9

DCF Model
Consensus Earnings Per Share Estimates
Atmos Energy Corp. (ATO)
www.reuters.com
7/29/2016

Line	Date	# of Estimates	Mean	High	Low
1	Quarter Ending Jun-16	8	0.59	0.61	0.56
2	Quarter Ending Sep-16	8	0.33	0.38	0.28
3	Year Ending Sep-16	11	3.29	3.34	3.20
4	Year Ending Sep-17	11	3.52	3.57	3.45
5	LT Growth Rate (%)	2	7.30	7.60	7.00

Exhibit JRW-10

Kansas Gas Service
Discounted Cash Flow Analysis

Gas Proxy Group

Dividend Yield*	2.80%
Adjustment Factor	1.028
Adjusted Dividend Yield	2.9%
Growth Rate**	5.60%
Equity Cost Rate	8.5%

* Page 2 of Exhibit JRW-10

** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW-10

Exhibit JRW-10

Kansas Gas Service
Monthly Dividend Yields

Panel A
Gas Proxy Group

Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
Atmos Energy Corporation (NYSE-ATO)	$1.68	2.1%	2.2%	2.4%
Chesapeake Utilities Corporation (NYSE-CPK)	$1.22	1.9%	2.0%	2.1%
New Jersey Resources Corp. (NYSE-NJR)	$0.96	2.6%	2.6%	2.8%
Northwest Natural Gas Co. (NYSE-NWN)	$1.87	2.9%	3.3%	3.5%
South Jersey Industries, Inc. (NYSE-SJI)	$1.06	3.4%	3.6%	4.0%
Southwest Gas Corporation (NYSE-SWX)	$1.80	2.3%	2.5%	2.8%
Spire, Inc. (NYSE-SR)	$1.96	2.8%	3.0%	3.1%
WGL Holdings, Inc. (NYSE-WGL)	$1.95	2.8%	2.9%	3.0%
Mean		2.6%	2.8%	3.0%
Median		2.7%	2.8%	2.9%

Data Sources: http://quote.yahoo.com, July 29, 2016.

Exhibit JRW-10

Kansas Gas Service
DCF Equity Cost Growth Rate Measures
Value Line Historic Growth Rates

Gas Proxy Group

Company	*Value Line* Historic Growth					
	Past 10 Years			Past 5 Years		
	Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
Atmos Energy Corporation (NYSE-ATO)	5.5	2.0	5.0	7.0	2.5	5.0
Chesapeake Utilities Corporation (NYSE-CPK)	8.0	3.5	9.0	10.0	5.0	8.0
New Jersey Resources (NYSE-NJR)	7.5	7.0	8.0	6.5	7.0	6.5
Northwest Natural Gas Co. (NYSE-NWN)	1.0	3.5	3.0	-5.0	3.0	2.5
South Jersey Industries, Inc. (NYSE-SJI)	7.0	9.0	8.0	4.0	9.5	8.5
Southwest Gas Corporation (NYSE-SWX)	8.5	6.0	5.5	10.0	9.0	5.5
Spire, Inc. (NYSE-SR)	3.0	2.5	7.5	-1.0	3.0	8.0
WGL Holdings, Inc. (NYSE-WGL)	2.5	3.0	4.0	2.5	3.5	2.5
Mean	5.4	4.6	6.3	4.3	5.3	5.8
Median	6.3	3.5	6.5	5.3	4.3	6.0
	Average of Median Figures =			5.3		

Data Source: *Value Line Investment Survey.*

Exhibit JRW-10

Kansas Gas Service
DCF Equity Cost Growth Rate Measures
Value Line Projected Growth Rates

Gas Proxy Group

Company	*Value Line* Projected Growth Est'd. '13-'15 to '19-'21*			*Value Line* Sustainable Growth		
	Earnings	Dividends	Book Value	Return on Equity	Retention Rate	Internal Growth
Atmos Energy Corporation (NYSE-ATO)	6.5	6.5	3.5	11.5%	48.0%	5.5%
Chesapeake Utilities Corporation (NYSE-CPK)	8.5	6.0	6.5	13.0%	62.0%	8.1%
New Jersey Resources (NYSE-NJR)	1.5	3.0	6.5	11.0%	45.0%	5.0%
Northwest Natural Gas Co. (NYSE-NWN)	7.0	2.0	2.5	9.5%	35.0%	3.3%
South Jersey Industries, Inc. (NYSE-SJI)	3.0	6.5	8.0	8.0%	20.0%	1.6%
Southwest Gas Corporation (NYSE-SWX)	7.0	8.5	3.0	12.0%	48.0%	5.8%
Spire, Inc. (NYSE-SR)	9.0	3.5	4.5	10.0%	50.0%	5.0%
WGL Holdings, Inc. (NYSE-WGL)	3.5	2.5	6.0	9.5%	38.0%	3.6%
Mean	5.8	4.8	5.1	10.6%	43.3%	4.7%
Median	6.5	4.8	5.1	10.5%	46.5%	5.0%
Average of Median Figures =		5.5			Median =	5.0%

* 'Est'd. '13-'15 to '19-'21' is the estimated growth rate from the base period 2013 to 2015 until the future period 2019 to 2019

Data Source: *Value Line Investment Survey.*

Exhibit JRW-10

Kansas Gas Service
DCF Equity Cost Growth Rate Measures
Analysts Projected EPS Growth Rate Estimates

Gas Proxy Group

Company	Yahoo	Reuters	Zacks	Mean
Atmos Energy Corporation (NYSE-ATO)	7.3%	7.3%	6.6%	7.1%
Chesapeake Utilities Corporation (NYSE-CPK)	3.0%	NA	NA	3.0%
Laclede Group, Inc. (NYSE-LG)	6.5%	6.5%	6.5%	6.5%
New Jersey Resources (NYSE-NJR)	4.0%	4.0%	4.0%	4.0%
Northwest Natural Gas Co. (NYSE-NWN)	6.0%	NA	10.0%	8.0%
South Jersey Industries, Inc. (NYSE-SJI)	4.0%	4.0%	4.5%	4.2%
Southwest Gas Corporation (NYSE-SWX)	4.8%	4.8%	4.6%	4.7%
WGL Holdings, Inc. (NYSE-WGL)	8.0%	8.0%	7.3%	7.8%
Mean	5.4%	5.8%	6.2%	5.7%
Median	5.4%	5.6%	6.5%	5.6%

Data Sources: www.reuters.com, www.zacks.com, http://quote.yahoo.com, July, 2016.

Exhibit JRW-10

Kansas Gas Service
DCF Growth Rate Indicators

Gas Proxy Groups

Growth Rate Indicator	Gas Proxy Group
Historic *Value Line* Growth in EPS, DPS, and BVPS	5.3%
Projected *Value Line* Growth in EPS, DPS, and BVPS	5.5%
Sustainable Growth ROE * Retention Rate	5.0%
Projected EPS Growth from Yahoo, Zacks, and Reuters - Mean/Median	5.7/5.6%

Exhibit JRW-11

Kansas Gas Service
Capital Asset Pricing Model

Gas Proxy Group

Risk-Free Interest Rate	4.00%
Beta*	0.75
Ex Ante Equity Risk Premium**	5.50%
CAPM Cost of Equity	8.1%

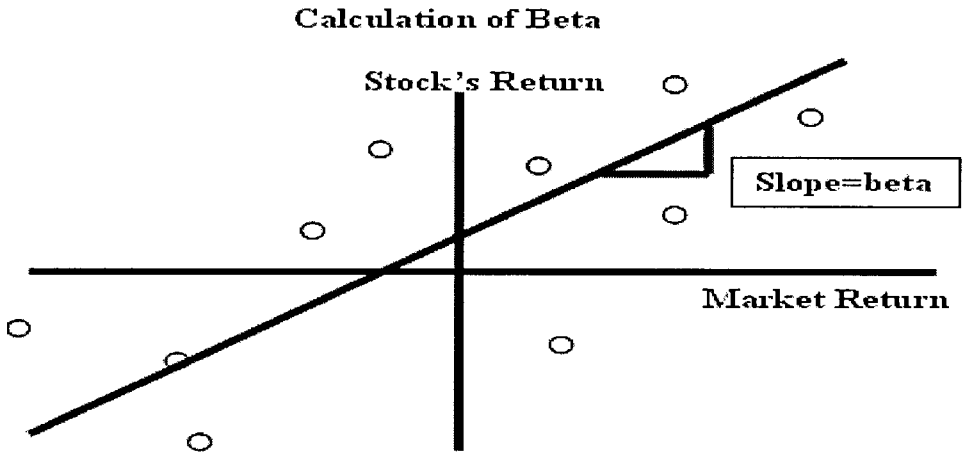
* See page 3 of Exhibit JRW-11

** See pages 5 and 6 of Exhibit JRW-11

Exhibit JRW-11

Thirty-Year U.S. Treasury Yields
2012-2016

Source: Federal Reserve Bank of St. Louis, FRED Database.



Gas Proxy Group

Company	Beta
Atmos Energy Corporation (NYSE-ATO)	0.75
Chesapeake Utilities Corporation (NYSE-CPK)	0.60
New Jersey Resources Corp. (NYSE-NJR)	0.80
Northwest Natural Gas Co. (NYSE-NWN)	0.65
South Jersey Industries, Inc. (NYSE-SJI)	0.80
Southwest Gas Corporation (NYSE-SWX)	0.75
Spire, Inc. (NYSE-SR)	0.70
WGL Holdings, Inc. (NYSE-WGL)	0.75
Mean	0.73
Median	0.75

Data Source: *Value Line Investment Survey*, 2016.

Exhibit JRW-11
Risk Premium Approaches

	Historical Ex Post Returns	**Surveys**	**Expected Return Models and Market Data**
Means of Assessing The Market Risk Premium	Historical Average Stock Minus Bond Returns	Surveys of CFOs, Financial Forecasters, Companies, Analysts on Expected Returns and Market Risk Premiums	Use Market Prices and Market Fundamentals (such as Growth Rates) to Compute Expected Returns and Market Risk Premiums
Problems/Debated Issues	Time Variation in Required Returns, Measurement and Time Period Issues, and Biases such as Market and Company Survivorship Bias	Questions Regarding Survey Histories, Responses, and Representativeness Surveys may be Subject to Biases, such as Extrapolation	Assumptions Regarding Expectations, Especially Growth

Source: Adapted from Antti Ilmanen, Expected Returns on Stocks and Bonds," *Journal of Portfolio Management*, (Winter 2003).

Exhibit JRW-11

Capital Asset Pricing Model
Equity Risk Premium

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Median
Historical Risk Premium										
	Ibbotson	2015	1928-2014	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2015	1928-2014	Historical Stock Returns - Bond Returns	Arithmetic				6.25%	
					Geometric				4.60%	
	Dimson, Marsh, Staunton	2015	1900-2014	Historical Stock Returns - Bond Returns	Arithmetic					
					Geometric				4.40%	
	Bate	2008	1900-2007	Historical Stock Returns - Bond Returns	Geometric				4.50%	
	Shiller	2006	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				7.00%	
					Geometric				5.50%	
	Siegel	2005	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				6.10%	
					Geometric				4.60%	
	Dimson, Marsh, and Staunton	2006	1900-2005	Historical Stock Returns - Bond Returns	Arithmetic				5.50%	
	Goyal & Welch	2006	1872-2004	Historical Stock Returns - Bond Returns					4.77%	
	Median									5.14%
Ex Ante Models (Puzzle Research)										
	Claus Thomas	2001	1985-1998	Abnormal Earnings Model					3.00%	
	Arnott and Bernstein	2002	1810-2001	Fundamentals - Div Yld + Growth					2.40%	
	Constantinides	2002	1872-2000	Historical Returns & Fundamentals - P/D & P/E					6.90%	
	Cornell	1999	1926-1997	Historical Returns & Fundamental GDP/Earnings		3.50%	5.50%	4.50%	4.50%	
	Easton, Taylor, et al	2002	1981-1998	Residual Income Model					5.30%	
	Fama French	2002	1951-2000	Fundamental DCF with EPS and DPS Growth		2.55%	4.32%		3.44%	
	Harris & Marston	2001	1982-1998	Fundamental DCF with Analysts' EPS Growth					7.14%	
	Best & Byrne	2001								
	McKinsey	2002	1962-2002	Fundamental (P/E, D/P, & Earnings Growth)		3.50%	4.00%		3.75%	
	Siegel	2005	1802-2001	Historical Earnings Yield	Geometric				2.50%	
	Grabowski	2006	1926-2005	Historical and Projected		3.50%	6.00%	4.75%	4.75%	
	Maheu & McCurdy	2006	1885-2003	Historical Excess Returns, Structural Breaks,		4.02%	5.10%	4.56%	4.56%	
	Bostock	2004	1960-2002	Bond Yields, Credit Risk, and Income Volatility		3.90%	1.30%	2.60%	2.60%	
	Bakshi & Chen	2005	1982-1998	Fundamentals - Interest Rates					7.31%	
	Donaldson, Kamstra, & Kramer	2006	1952-2004	Fundamental, Dividend yld., Returns,, & Volatility		3.00%	4.00%	3.50%	3.50%	
	Campbell	2008	1982-2007	Historical & Projections (D/P & Earnings Growth)		4.10%	5.40%		4.75%	
	Best & Byrne	2001	Projection	Fundamentals - Div Yld + Growth					2.00%	
	Fernandez	2007	Projection	Required Equity Risk Premium					4.00%	
	DeLong & Magin	2008	Projection	Earnings Yield - TIPS					3.22%	
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2016	Projection	Normalized with 4.0% Long-Term Treasury Yield					5.50%	
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Damodaran	2016	Projection	Fundamentals - Implied from FCF to Equity Model					5.61%	
	Social Security									
	Office of Chief Actuary		1900-1995							
	John Campbell	2001	1860-2000	Historical & Projections (D/P & Earnings Growth)	Arithmetic	3.00%	4.00%	3.50%	3.50%	
			Projected for 75 Years		Geometric	1.50%	2.50%	2.00%	2.00%	
	Peter Diamond	2001	Projected for 75 Years	Fundamentals (D/P, GDP Growth)		3.00%	4.80%	3.90%	3.90%	
	John Shoven	2001	Projected for 75 Years	Fundamentals (D/P, P/E, GDP Growth)		3.00%	3.50%	3.25%	3.25%	
	Median									4.00%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5.70%	
0	Survey of Financial Forecasters	2016	10-Year Projection	About 20 Financial Forecastsers					1.90%	
	Duke - CFO Magazine Survey	2016	10-Year Projection	Approximately 500 CFOs					4.55%	
	Welch - Academics	2008	30-Year Projection	Random Academics		5.00%	5.74%	5.37%	5.37%	
	Fernandez - Academics, Analysts, and Compan	2016	Long-Term	Survey of Academics, Analysts, and Companies					5.30%	
	Median									5.30%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Woolridge		2015	Current Supply Model (D/P & Earnings Growth)					4.50%	
	Median									4.12%
Mean										4.64%
Median										4.63%

Exhibit JRW-11

Capital Asset Pricing Model
Equity Risk Premium

Summary of 2010-16 Equity Risk Premium Studies

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Average
Historical Risk Premium										
	Ibbotson	2015	1928-2014	Historical Stock Returns - Bond Returns	Arithmetic				6.00%	
					Geometric				4.40%	
	Damodaran	2015	1928-2014	Historical Stock Returns - Bond Returns	Arithmetic				6.25%	
					Geometric				4.60%	
	Dimson, Marsh, Staunton	2015	1900-2014	Historical Stock Returns - Bond Returns	Arithmetic					
					Geometric				4.40%	
	Median									5.13%
Ex Ante Models (Puzzle Research)										
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2016	Projection	Normalized with 4.0% Long-Term Treasury Yield					5.50%	
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Damodaran	2016	Projection	Fundamentals - Implied from FCF to Equity Model					5.61%	
	Median									5.50%
Surveys										
	Duarte & Rosa - NY Fed	2015	Projection	Projections from 29 Models					5.70%	
	Survey of Financial Forecasters	2016	10-Year Projection	About 20 Financial Forecastsers					1.90%	
	Duke - CFO Magazine Survey	2016	10-Year Projection	Approximately 500 CFOs					4.55%	
	Fernandez - Academics, Analysts, and Companies	2016	Long-Term	Survey of Academics, Analysts, and Companies					5.30%	
	Median									4.93%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5.21%	
					Geometric			4.20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4.00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3.00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4.63%	4.12%	
					Geometric			3.60%		
	Wooldridge	2015	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				4.50%	
	Median									4.12%
Mean										**4.92%**
Median										**5.03%**

Kansas Gas Service's Recommended Rate of Return

Capital Source	Capitalization Ratio	Cost Rate	Weighted Cost Rate
Long-Term Debt	45.00%	3.95%	1.78%
Common Equity	55.00%	10.00%	5.50%
Total	100.00%		7.28%

Summary of Dr. Fairchild's ROE Results

Panel A

Equity Cost Rate Approaches and Results

Approach	Equity Cost Rate
DCF	8.5% - 9.5%
CAPM	9.4% - 10.5%
RP	9.5% - 9.7%
ROE Recommendation	10.00%

Panel B
DCF Results

	DCF
Adjusted Dividend Yield	3..0%
Growth	5.5% - 6.5%
DCF Result	8.5% - 9.5%

Panel C
CAPM Results

	Historical CAPM	Projected CAPM
Risk-Free Rate	2.62%	2.62%
Beta	0.76	0.76
Market Risk Premium	7.00%	8.39%
CAPM Result	7.91%	8.97%
Size Adjustment	1.49%	1.49%
Adjusted CAPM Result	9.40%	10.46%

Panel D
Risk Premium Results

	Unadjusted RP	Adjusted RP
Base Yield	4.11%	4.11%
Risk Premium	5.38%	5.58%
RP Equity Cost Rate	9.49%	9.69%

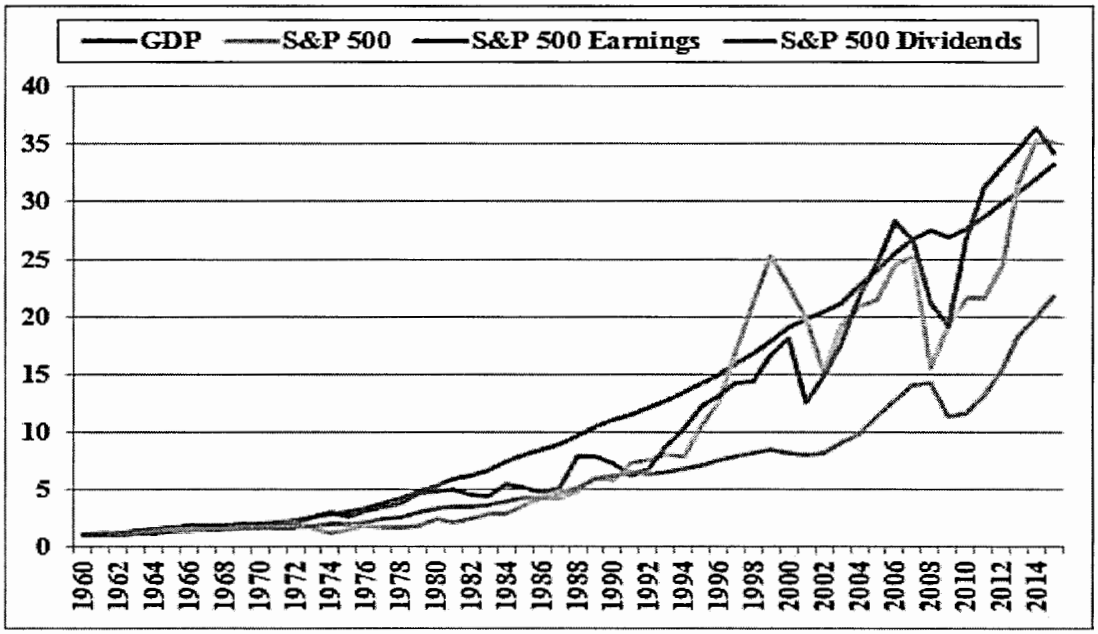
Panel E
Comparable Earnings Results

	2016	2017	2019-21
LDC Average	10.50%	10.80%	11.20%

Growth Rates
GDP, S&P 500 Price, EPS, and DPS

	GDP	S&P 500	Earnings	Dividends	
1960	535.1	58.11	3.10	1.98	
1961	547.6	71.55	3.37	2.04	
1962	586.9	63.10	3.67	2.15	
1963	619.3	75.02	4.13	2.35	
1964	662.9	84.75	4.76	2.58	
1965	710.7	92.43	5.30	2.83	
1966	781.9	80.33	5.41	2.88	
1967	838.2	96.47	5.46	2.98	
1968	899.3	103.86	5.72	3.04	
1969	982.3	92.06	6.10	3.24	
1970	1049.1	92.15	5.51	3.19	
1971	1119.3	102.09	5.57	3.16	
1972	1219.5	118.05	6.17	3.19	
1973	1356.0	97.55	7.96	3.61	
1974	1486.2	68.56	9.35	3.72	
1975	1610.6	90.19	7.71	3.73	
1976	1790.3	107.46	9.75	4.22	
1977	2028.4	95.10	10.87	4.86	
1978	2278.2	96.11	11.64	5.18	
1979	2570.0	107.94	14.55	5.97	
1980	2796.8	135.76	14.99	6.44	
1981	3138.4	122.55	15.18	6.83	
1982	3313.9	140.64	13.82	6.93	
1983	3541.1	164.93	13.29	7.12	
1984	3952.8	167.24	16.84	7.83	
1985	4270.4	211.28	15.68	8.20	
1986	4536.1	242.17	14.43	8.19	
1987	4781.9	247.08	16.04	9.17	
1988	5155.1	277.72	24.12	10.22	
1989	5570.0	353.40	24.32	11.73	
1990	5914.6	330.22	22.65	12.35	
1991	6110.1	417.09	19.30	12.97	
1992	6434.7	435.71	20.87	12.64	
1993	6794.9	466.45	26.90	12.69	
1994	7197.8	459.27	31.75	13.36	
1995	7583.4	615.93	37.70	14.17	
1996	7978.3	740.74	40.63	14.89	
1997	8483.2	970.43	44.09	15.52	
1998	8954.8	1229.23	44.27	16.20	
1999	9510.5	1469.25	51.68	16.71	
2000	10148.2	1320.28	56.13	16.27	
2001	10564.6	1148.09	38.85	15.74	
2002	10876.9	879.82	46.04	16.08	
2003	11332.4	1111.91	54.69	17.88	
2004	12088.6	1211.92	67.68	19.41	
2005	12888.9	1248.29	76.45	22.38	
2006	13684.7	1418.30	87.72	25.05	
2007	14322.9	1468.36	82.54	27.73	
2008	14752.4	903.25	65.39	28.05	
2009	14414.6	1115.10	59.65	22.31	
2010	14798.5	1257.64	83.66	23.12	
2011	15379.2	1257.60	97.05	26.02	Average
2012	16027.2	1426.19	102.47	30.44	
2013	16498.1	1848.36	107.45	36.28	
2014	17183.5	2058.90	113.01	39.44	
2015	17803.4	2043.94	106.32	43.16	
Growth Rates	**6.58**	**6.69**	**6.64**	**5.76**	**6.42**

Long-Term Growth of GDP, S&P 500, S&P 500 EPS, and S&P 500 DPS



	GDP	S&P 500	S&P 500 EPS	S&P 500 DPS
Growth Rates	6.58%	6.69%	6.64%	5.76%

Panel A
Historic GDP Growth Rates

10-Year Average	**3.28%**
20-Year Average	**4.36%**
30-Year Average	**4.87%**
40-Year Average	**6.19%**
50-Year Average	**6.65%**

Calculated using GDP data on Page 1 of Exhibit JRW-14

Panel B
Projected GDP Growth Rates

	Time Frame	Projected Nominal GDP Growth Rate
Congressional Budget Office	**2016-2026**	**4.1%**
Survey of Financial Forecasters	**Ten Year**	**4.5%**
Social Security Administration	**2016-2090**	**4.4%**
Energy Information Administration	**2013-2040**	**4.4%**

Sources:

www.cbo.gov/publication/51129

http://www.eia.gov/forecasts/aeo/tables_ref.cfm Table 20

http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/2016/

http://www.ssa.gov/oact/tr/2016/X1_trLOT.html

CERTIFICATE OF SERVICE

16-KGSG-491-RTS

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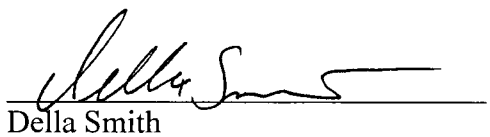

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